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ABSTRACT

These 10 papers focus on the key to excellence in vocational education in light of teacher assessment and effective assessment systems, challenges to testing students and teachers and the legal implications, basic and employability skills, and the need for vocational teacher technological update strategies. "Introduction and Colloquium Purpose" (Rupert Evans) offers a brief introduction to the above concerns. "Assessing the Professional Performance of Teachers: Promising Principles and Practices" (Glen Fardig) considers what should be assessed, the skills of effective vocational teaching, and what needs to be accomplished. "The Law and Testing of Students and Teachers" (August W. Steinhilber) addresses the legality of testing. "Basic Skills--Integration of Mathematics and Science into the Teaching of Vocational Education" (Donald Maley) considers the reasons and opportunities for this integration, including the process, systems, and construction approaches. "Basic Skills into the Teaching of Vocational Education" (Dewey Allen Adams) offers a broader range of "basics," discusses how a broader focus enhances vocational education, and suggests implications for the preparation and inservice education of vocational teaching personnel. "Employability Skills--Basics for Employment: 'Keeping the Job'" (Lee W. Stewart) discusses the basics that are considered by industry to be a condition for graduation and includes a lengthy description of the Virginia Peninsula Vocational Training Council. "Drive for Show--Putt for Dough: Teaching Employability Skills in Occupational Education" (Richard D. Jones) focuses on the importance of employability skills. "A Strategy for Vocational Teacher Technological Update" (James B. Hamilton) discusses the need for such a strategy and characteristics essential to it. "Technological Update--Who's Responsible?" (Gary Bunch) considers obstacles and solutions. "Summarization" (Rupert Evans) highlights these themes: the basics, technical updating, Individualized Educational Plan for teachers, and program improvement. (YLB)

In-Service Teacher Education
A Key To Excellence in Vocational Education

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In-Service Teacher Education:
A Key To Excellence In Vocational Education

Proceedings of a National Conference

Editors
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Coordinating Committee on Research in Vocational Education
in cooperation with the
American Vocational Education Personnel Development Association
and the
National Research Coordinating Unit Association

In-service Teacher Education: A Key to Excellence in Vocational Education includes the papers presented at the Colloquium on In-Service Teacher Education: A Key To Excellence held at the Federal Office Building FOB-6 in Washington, D.C. on April 10, 1985. These invited papers focus on the key to excellence in vocational education in the light of teacher assessment and effective assessment systems; challenges to testing students and teachers and the legal implications; basic and employability skills -- opportunities for vocational education, industry's concerns, and the enhancement possibilities of a broader range of skills; and the need for vocational teacher technological update strategies.

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Preface

The focus of the 1985 Invitational Colloquium held in Washington, D.C. was reflected in the title, **In-Service Teacher Education: A Key To Excellence in Vocational Education.** The Colloquium's distinguished speakers looked at the integration of basic skills into curriculum and the assessment of the professional performance of teachers. They delved into the legal aspects of competency testing and strategies for vocational teacher technological updating.

It is appropriate to acknowledge the Colloquium's three sponsoring agencies. The Coordinating Committee on Research in Vocational Education (CCRVE), worked in cooperation with the American Vocational Education Personnel Development Association (AVEPDA) and the National Research Coordinating Unit Association (NRCUA) to arrange the Colloquium.

The CCRVE is concerned with research and related program improvement functions for vocational and career education. The Committee was established by the 1976 Amendments to the Vocational Education Act.

The American Vocational Education Personnel Development Association is an affiliate of the American Vocational Association, New and Related Services Division and is devoted to program improvement issues in the preparation and upgrading of vocational personnel at the local and state levels.

The NRCUA is an association of State Research Coordinating Unit staff and is primarily involved in professional development of RCU staff and the improvement of vocational practice through research, curriculum development and evaluation activities. The RCUs are mandated to coordinate research, curriculum development and innovative program improvement activities to receive funds for research and development.

It is hoped that publication of these presentations will offer a thought-provoking resource for those who were unable to attend the Colloquium and a reference tool for those involved in teacher education.

Howard F. Hjelm, Director
Division of Innovation & Development
Office of Vocational & Adult Education
April, 1985

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Introduction and Colloquium Purpose
Given by Rupert Evans

This is one of a series of annual invitational colloquia on vocational teacher education sponsored by the Coordinating Committee on Research in Vocational Education of the United States Department of Education. Several in the series have been (and this one is, also) sponsored by the American Vocational Education Personnel Development Association and the National Research Coordinating Unit Association. These organizations have a deep and abiding interest in maintaining and improving the quality of personnel in vocational education.

The colloquia are invitational, not to try to exclude anyone, but rather to promote active discussion of the thoughtful papers which are presented. Having a small group present promotes this discussion. In order to spread the ideas which grow out of the presentations and discussions, the revised papers are disseminated throughout the nation. We are fortunate, this year, in having the Illinois Vocational Curriculum Center and East Central Network for Curriculum Coordination as our editors, printers and publishers. Ms. Rebecca Douglass and Dr. Ruth Patton are noted for the quality of their work. I would love to say more about the merits of people from Illinois, but modesty forbids.

Our colloquium today focuses on an extremely important and often overlooked part of vocational staff development. It has the title, "In-service Teacher Education: A Key to Excellence in Vocational Education."

In-service teacher education has always been important in vocational education because many of our teachers have little or no pre-service teacher education. These people (and many teachers who have received pre-service teacher education) can do a better job of planning, presenting and evaluating instruction if they have received high quality in-service teacher education.

Pre-service teacher education is even more important today than it was when I began teaching, because of the rapid advances in technology which soon render obsolete much of what we teachers know. In-service education is a way of renewing our technological competence.

Another factor which makes in-service teacher education particularly important today is the renewed demand for teaching academic and occupational basics through vocational education. Because few teachers are being graduated from pre-service programs, in-service education must bear the burden of teaching how to teach these skills and how to work more effectively with others who are teaching them.

Finally, this is a good time for a colloquium on in-service teacher education because we have better tools now for assessing teacher competency and greater demands for doing it. Any sound program of teacher assessment is accompanied by ways of strengthening the areas of weakness which have been found. In-service teacher education programs provide assistance in remedying problems.

As we go through our program, you will see that all of these concerns (and more) have been addressed by our presenters. Please help us to further explore their ideas through full and unrestrained discussion.

Assessing the Professional Performance of Teachers: Promising Principles and Practices

By Glen Fardig

How can we improve the instructional performance of vocational teachers? What part does teacher assessment have to play in improving instruction? How can we identify the skills that vocational teachers must have if they are to be effective in their classrooms and laboratories? These are most timely questions in today's political and educational climate. The improvement of vocational instruction does indeed depend on identifying competent teachers, diagnosing incompetence and weakness, and providing assistance and remediation where it is found to be needed.

The current climate has created demands for more specific descriptions of effective teaching and more stringent standards for teaching competence. Yet, present methods of evaluating teachers are inadequate. The most used methods (paper-and-pencil tests of general and professional knowledge, ratings of overall teacher performance) have little to recommend them. They are used mainly because we have had few ideas about how to do better. At least they give the appearance that we are trying to do something about this long-term and basic problem of teacher preparation and performance.

It is encouraging that there are real efforts under way to change the situation. Many states and individual school systems are working on the problem of teacher assessment, and are putting more effective systems in place. Notable examples are the states of Georgia, Virginia, and Florida, along with school systems in Toledo and Salt Lake City. Vocational teachers, of course, are participating in these assessment systems and are being affected by them, sometimes in special ways.

The extensive effort in Florida warrants close examination. It is an advanced system of assessment built on a sound foundation of teacher effectiveness research. The Florida experience illuminates both the great potential and the possible limitations of approach. There is reason to contend that all assessment systems must be similarly constructed if teacher assessment is to have a significant impact on the improvement of instruction.

Because we are attempting to revise and reform so many aspects of vocational education at the same time, it is easy to lose sight of the important purposes of assessing inservice vocational teachers. Each of these has unique problems and special requirements. Some form of assessment is used to:

1. Control entry into the profession. A satisfactory assessment result may be required before a regular teaching certificate is issued. For vocational teachers wishing to enter the teaching profession directly from business and industry, this may be an inservice function of assessment.
2. Reward and promote deserving teachers. Merit pay plans and master teacher programs usually have assessment procedures built into them. Because such assessments directly impinge on teachers' salaries and careers, the criteria of assessment are hotly discussed and negotiated issues.

3. Remove incompetent teachers. Though often difficult and painful to accomplish, we must begin to regulate and police our profession much more thoroughly than in the past. A valid and legally defensible assessment procedure is essential.
4. Improve the instructional performance of teachers. Regrettably, the improvement of instruction through teacher assessment has been of lesser concern among vocational educators. The results of evaluation can, however, be used to prescribe remediation leading clearly to improved teaching performance. Even experienced and generally competent teachers can greatly benefit from refining their skills after assessment.
5. Improve teacher preparation programs. The logic of using inservice teacher assessment data to identify areas of weakness in teacher preparation programs is inescapable. This function of assessment deserves far more attention and far wider application than it now receives.

What Should We Assess?

Obviously, vocational teachers must possess the requisite technical skills for their occupational subject area. Assessment is necessary to determine whether the teacher's technical skills are complete, up-to-date, and meet occupational standards. This requires a specialized form of assessment beyond the scope of this paper.

A second type of assessment involves the evaluation of teacher's general education. Though widely accepted, evaluation of this aspect of teacher characteristics has weak potential for furthering improvement in instruction. There is little or no evidence that the teacher's level of general education is related to student learning. On the other hand, society does have a right to expect teachers to be literate and well informed members of the community. Vocational teachers in particular often serve as role models for students and should therefore meet reasonable educational expectations. Vocational education should not request lower standards be applied to its teachers, for this appears to be an admission of inferiority.

The assessment of teachers' professional knowledge (that is, how students learn and how they should be taught) is equally devoid of promise. Research has failed to establish the predictive validity of professional knowledge tests, though professional knowledge itself may be useful in acquiring and applying certain effective teaching behaviors. It must be admitted, however, that public pressures and political expediency have created renewed interest in such tests. Vocational teachers, as others, are required in many states to pass a professional knowledge test before they receive a teaching certificate. Again, teachers coming to the profession directly from business and industry are often at a disadvantage.

Vocational teachers and vocational programs have often been evaluated on the basis of student placement rate. Though seemingly attractive, this criterion of effectiveness is patently unfair. There are too many variables affecting job placement over which the teacher has no control: e.g., student ability, general economic conditions, short-term

community needs, rapidly changing technology. Vocational educators would be well advised to point out to others the limitations of placement rate as an evaluation device.

If we are going to find a valid basis for assessing the effectiveness of vocational teachers we must look to the results of educational research dealing with the teacher's behavior in the classroom and laboratory. In this form of assessment we are concerned with specific observable behaviors related to student learning and achievement. Though the research effort has been going on for generations, only recently has enough evidence accumulated on which to build assessment instruments and procedures. We are now able to observe the teacher's performance and gain sufficient information about his or her use of the best teaching practice as it is currently understood.

The use of "low inference" measures allows a more accurate analysis of a teacher's performance than the global measures heretofor typically applied. In low inference techniques the evaluator finds it relatively easy to describe objectively what is happening in the classroom. For example, the descriptor, "The teacher circulates and assists students," is readily observable and quantifiable. We know that when a teacher circulates in the classroom or laboratory and assists students, student learning is increased. In contrast, note a high-inference measure; "The teacher provides a warm and supportive classroom atmosphere." This is almost impossible to evaluate objectively, it is difficult even to define, and its relation to student learning is not strong. Classroom atmosphere may be affected by many factors, only one of which is the teacher's behavior.

Identifying the Skills of Effective Vocational Teaching

Being able to focus on the skills needed by vocational teachers is critical to the task of valid teacher assessment. So called "process/product studies" are now providing the crucial links between teacher behaviors and student learning. In these studies the process of what the teacher actually does, is correlated with the product; i.e., the demonstrable effect on students. Such studies must be most carefully designed and rigorously carried out to avoid the contaminating effect of uncontrolled variables. The teaching behaviors so identified tend to be very specific and limited in scope rather than broad and general.

It must be acknowledged that consensus studies and expert opinion as to what constitutes good vocational teaching have served vocational education well as a foundation for much developmental work. But these kinds of studies have now served their purpose. Not resting on our laurels, vocational educators must build on what we have, using more precise and rigorous measures, and applying experimental research techniques.

The Florida Performance Measurement System (FPMS), now gaining national attention, is an example of the new thrust in teacher assessment. It is the most ambitious attempt so far to identify effective teaching behaviors by a thorough analysis of the literature of teacher effectiveness research. Currently, 134 indicators of effective teaching behaviors have been identified, appropriate for teachers at all educational levels and in all subject areas, including vocational education. The indicators have been grouped for convenience

into six "Domains" of teaching: (1) Planning, (2) Management of Student Conduct, (3) Instructional Organization and Development, (4) Presentation of Subject Matter, (5) Communication: Verbal and Nonverbal, and (6) Student Testing. The research analysis for all 134 indicators is fully described in the document, Domains: Knowledge Base of the Florida Performance Measurement System.

A small sample of the indicators provides some idea of the kind of effective teaching indicators that have been identified, and their applicability to vocational instruction. In the group of indicators related to classroom questioning, for example, there are specific indicators on the use of low-order (recall) questions, using high-order questions, pause following a question, and avoiding multiple questions (overload). In using time efficiently, effective teachers make smooth transitions from one activity to another, avoid having students wait for assistance, control interruptions, and are punctual in beginning class. When effective teachers need to stop deviant student behavior, they make it clear what behavior is unacceptable, they are firm in their demands but do not use rough speech or actions, and they seek to refocus the student's attention on an approved behavior.

If these seem to be simply "common sense," it should be pointed out that there are other long-accepted ideas about vocational teaching that are not supported by pedagogical research. Thoroughly constructed formal lesson plans, for example, are not related to the amount of learning that takes place in the classroom. Practice, by itself, does not ensure learning a skill. While individualized instruction has many advantages for educational management, its benefits to student learning are only weakly supported.

Vocational teachers must certainly be trained to be able to perform all the generic teaching skills associated with student learning. They should also be assessed on these skills, using the same standards as for other teachers. Yet, there are limitations to assessment based on research on pedagogy that must be faced. The first is that the overwhelming body of research on teacher behaviors has been conducted in the elementary school setting. Moreover, cognitive or "academic" subjects have most often been the focus of investigation. There is no doubt that until we have contradictory evidence, we must extrapolate these findings to the secondary student and adult learner, and to the teaching of occupational skills.

Secondly, educational researchers have been most often concerned with teacher-directed expository instruction, typified by a teacher standing in front of a class conducting a lesson. This has never been the predominant method for vocational training, and with the recent advent of competency- based vocational education, the formal lesson has all but disappeared. There has been relatively little process/product research done on the teaching of psychomotor skills and on teaching in a laboratory setting. Having said that, the effective teaching indicators identified by the FPMS effort are a real contribution to our understanding of what all teachers need to be able to do, and a basis for valid and useful assessment.

From the 134 research-identified teaching behaviors in the Florida Performance

Measurement System, a classroom observation and assessment instrument has been developed. The FPMS Summative Instrument consists of 39 statements condensed from the total indicators and organized for use by a trained observer in the classroom. Typically, the observer remains for a class period and makes a frequency count (tally marks) of the incidence of each indicator. Later, the tally sheets are scored and normed by an independent agency to maintain the security and objectivity of the system.

The FPMS Summative Instrument must, of course, be used with good sense and an understanding of its potential limitations. For one thing, systematic and thorough training for FPMS observers is absolutely essential if the instrument is to function as intended. The state of Florida provides intensive three-day training sessions, and trainees must pass a performance test in order to be certified as approved observers. A single observation period for assessing a teacher can also lead to unreliable results. Several assessments spread over a period of time and preferably done by different observers, provide stronger and more useful information.

There are other factors that may affect the assessment. Observer bias can distort results and sympathetic observers may be loathe to record ineffective behaviors. These effects could be minimized by organizing a state cadre of trained observers who would be available to schools on call, rather than using local education personnel for the job. The teacher, too, may contribute to less than accurate assessments. Under stress during formal assessment, the teacher may not behave in typical fashion. There is also the possibility that a vocational teacher may play a role by conducting an expository lesson designed to satisfy the requirements of the assessment instrument, and not conduct a laboratory session or direct individualized instruction. The time-worn "golden lesson," rehearsed and reduplicated to impress a visitor is an unpraiseworthy tradition of teaching.

What Needs to be Accomplished

Having recited some possible limitations and difficulties, it should be noted that the concept of assessment by objectively recording a teacher's classroom behavior in the skills of effective teaching is still a great step forward. It has great potential for improving instruction by applying the results of research in the classroom. However, the work in this area will never be finally accomplished. Assessment criteria and procedures will always be in a state of change as we continue to gain understanding of the teaching/learning process.

Vocational educators need to conduct process/product research on effective vocational teaching. There is still much to be learned about effective teaching behaviors for laboratory and one-on-one instruction. We must know more about teaching skills related to individualized and self-paced instruction. If there are indeed specific teaching behaviors that are unique to the improvement of adult learning, these must be clearly identified. Special assessment procedures and observer training materials must be developed so that vocational teachers are assessed accurately and equitably. It is encouraging that work along these lines is now going on.

Vocational teacher educators should begin to use the findings of teacher assessment studies as a basis for examining their own teacher preparation programs. Areas of teaching in which graduates consistently show weakness can be readily identified and marked for improvement. Obviously, every preservice and inservice teacher should receive systematic training in each of the effective teaching behaviors, and achievement should be judged on observed performance. Vocational educators at several levels should be involved in the development of remediation materials, such as individualized learning packages, for vocational teachers who need additional help in reaching proficiency in any of the identified skills of teaching.

Finally, teacher assessment must be accepted by all vocational educators as a way of improving vocational teaching. Vocational teachers must view assessment not as a threat, but as a benefit to themselves professionally and as a genuine gain for their students in increased learning. Local administrators must look beyond the routine of annual evaluation to the improvement of vocational programs. State vocational personnel can utilize assessment data to plan inservice activities, organize an effective beginning teacher program, refine standards for certification and accreditation, and devise realistic master teacher programs. Years of work are now beginning to bear fruit in the form of knowledge about what makes an effective teacher. We must make good use of that knowledge so that vocational students can learn more and can become even more successful in their chosen occupations.

DOMAINS, CONCEPTS, AND INDICATORS
FLORIDA PERFORMANCE MEASUREMENT SYSTEM

DOMAIN I
PLANNING

1.1 Content Coverage
- 1.1.1 Identification/selection of content
- 1.1.2 Analysis of content
- 1.1.3 Evaluation of content
- 1.1.4 Sequencing of content
- 1.1.5 Pacing of content

1.2 Utilization of Instructional Materials
- 1.2.1 Identification/selection of materials
- 1.2.2 Analysis of instructional materials
- 1.2.3 Evaluation of instructional material
- 1.2.4 Management of instructional material

1.3 Activity Structure

- 1.3.1 Identification/selection of instructional activity
- 1.3.2 Sequencing of instructional activity
- 1.3.3 Analysis of instructional activity
- 1.3.4 Pacing of instructional activity
- 1.3.5 Evaluation of instructional activity
- 1.3.6 Specification of activity format

1.4 Goal Focusing

- 1.4.1 Identification of expected learner outcome
- 1.4.2 Evaluation of goal/instruction congruence
- 1.4.3 Justification of goals

1.5 Diagnosis

- 1.5.1 Identification of learner state
- 1.5.2 Matches learner needs with instructional element(s)
- 1.5.3 Evaluation of learner end-state

DOMAIN 2
MANAGEMENT OF STUDENT CONDUCT

2.1 Rule Explication and Monitoring

- 2.1.1
- 2.1.2 Rule specification and clarification
- 2.1.3 Rule practice
- 2.1.4 Rule monitoring

2.2 Teacher With-itness

- 2.2.1 Deviancy spread
- 2.2.2 Desist major deviance
- 2.2.3 Correct target desist
- 2.2.4 Alternative behavior

2.3 Overlapping (With-itness)

- 2.3.1 Task-desist overlap
- 2.3.2 Task-intrusion overlap

2.4 Quality of Desist

- 2.4.1 Clarity of desist
- 2.4.2 Firmness of desist

2.4.3 Roughness of desist

2.4.4 Task-focus desist

2.4.5 Approval-focus desist

2.5 Group Alert

2.5.1 Poses question, selects reciter

2.5.2. Unison stimulus

2.5.3 Alerts non-performers

2.6 Movement Smoothness (smoothness = absence of jerkiness)

2.6.1 Reacts to or interjects irrelevancies

2.6.2 Flip-flop or dangle

2.7 Movement Slowdown

2.7.1 Overdwelling

2.7.2 Group fragmentation

2.7.3 Prop fragmentation

2.8 Effective Praise

2.8.1 Specific praise

2.8.2 Praise for compliance

2.8.3 Low-key praise

2.8.4 Conditional praise

2.8.5 Authentic praise

2.8.6 Teacher control of group praise

DOMAIN 3

INSTRUCTIONAL OROGANIZATION AND DEVELOPMENT

3.1 Efficient Use of Time

3.1.1 Punctuality

3.1.2 Management transition

3.1.3 Wait-time avoidance

3.1.4 Controlled interruptions

3.1.5 Housekeeping

3.2 Review of Subject Matter

3.2.1 Lesson-initiating review

3.2.2 Topic summary within lesson

3.2.3 Lesson-end review

3.3 Lesson Development

- 3.3.1 Lesson initiation
- 3.3.2 Academic transition signals
- 3.3.3 Solo performance
- 3.3.4 Academic comprehension check
- 3.3.5 Low-order questions
- 3.3.6 High-order questions
- 3.3.7 Nonacademic questions
- 3.3.8 Congruence of answer
- 3.3.9 Choral practice
- 3.3.10 Pause following a question

3.4 Teacher Treatment of Student Talk

- 3.4.1 Acknowledges a student response
- 3.4.2 Probes or amplifies student response
- 3.4.3 Restates student response
- 3.4.4 Avoids digression

3.5 Teacher Academic Feedback

- 3.5.1 Simple positive response
- 3.5.2 Academic praise
- 3.5.3 Correctives
- 3.5.4 Redirects after student response

3.6 Management of Seatwork/Homework

- 3.6.1 Gives seatwork or homework directions
- 3.6.2 Checks comprehension of seatwork/homework
- 3.6.3 Sets time for checking seatwork/homework
- 3.6.4 Teacher mobility
- 3.6.5 Holds students accountable and gives feedback

DOMAIN 4
PRESENTATION OF SUBJECT MATTER

4.1 Presentation of Interpretive (Conceptual) Knowledge

- 4.1.1 Gives definition only
- 4.1.2 Gives example(s) only
- 4.1.3 Tests example (rule-example)
- 4.1.4 Identifies attributes

4.1.5 Distinguishes related concepts

4.1.6 Concept induction

4.2 Presentation of Explanatory (Laws or Law-like) Knowledge

4.2.1 Explicates the cause

4.2.2 Explicates the effect

4.2.3 States causal principle, using linking words

4.2.4 Applies a causal principle

4.3 Presentation of Academic Rules

4.3.1 Describes the situation

4.3.2 Provides for application (practice)

4.4 Presentation of Value Knowledge

4.4.1 States and explores a value question

4.4.2 Develops criteria of judgement

4.4.3 Assembles the facts

4.4.4 Tests the value judgment

DOMAIN 5
COMMUNICATION: VERBAL AND NONVERBAL

5.1 Control of Discourse

5.1.1 Connected discourse

5.1.2 Scrambled discourse

5.1.3 Vagueness words

5.1.4 Question overload

5.1.5 Single questions

5.2 Emphasis

5.2.1 Marker expressions

5.2.2 Marker techniques

5.2.3 Repetition

5.3 Task Attraction and Challenge

5.3.1 Task attraction

5.3.2 Challenge

5.4 Teacher's Speech

- 5.4.1 Loud, noisy, or grating voice
- 5.4.2 Shrill, piercing, high pitched voice
- 5.4.3 Monotone--fails to vary intensity, rate and volume of speech
- 5.4.4 Speaks too softly, almost inaudibly

5.5 Body Language

- 5.5.1 Teacher smiles
- 5.5.2 Deadpan expression
- 5.5.3 Teacher frowns
- 5.5.4 Posture and movememt
- 5.5.5 Eye contact

DOMAIN 6

TESTING: STUDENT PREPARATION, ADMINISTRATION, FEEDBACK

6.1 Preparation for Testing

- 6.1.1 Orients students to test
- 6.1.2 Specifies test content
- 6.1.3 Instructs students in test-taking

6.2 Test Administration

- 6.2.1 Arranges physical setting
- 6.2.2 Makes positive statements
- 6.2.3 Monitors examination

The Law and Testing of Students and Teachers
by August W. Steinhilber

A. Students

If one were to raise the question of whether high school students must pass some sort of competency exam before graduation you would hear the following cries of alarm:

You are denying me an opportunity for college!
You are precluding me from being employed in a job that pays well!
You have placed upon me the stigma of failure!
If I don't pass the test it is your fault, not mine!

Yet, since the National Commission on Excellence in Education issued its report, A Nation at Risk, the matter of competency testing has become part of the agenda for reform of public education. Furthermore, most of these arguments have failed in the courts, except in the case of a desegregation order or where the implementation of a testing program has been so close in time to graduation that there was no opportunity for remediation. However, there is room for concern on the legality of some tests.

There is no question, however, that a local school district has the inherent power to test students and to impose additional graduation requirements beyond the normal course work taken in high school. See, Wells v. Banks, 266 SE 2d 270 (1980) and Board of Education v. Ambach, 436 NYS 2d 564 (1982).

The first challenge normally made to a student test is that it, in some way, violates the equal protection clause of the 14th Amendment. An initial complaint is that the subject matter of the test was not taught in the school; the second complaint based on the equal protection clause is that the old dual school system was inferior, therefore any subject matter test after the merger and desegregation is unfair. If, indeed, the subject matter has been taught and if sufficient time has elapsed between the desegregation order and the implementation of the test, the program will meet the constitutional standard on equal protection. The second challenge normally made is that the test violates the due process provision of the 14th Amendment, which states: "...nor shall any state deprive any person of life, liberty or property without due process of law." If the school system can defend the test as being fair and that the students and parents had adequate notice of the program, and once again sufficient time has elapsed between the announcement of the test and the effective date, and furthermore, if there is time for remediation and reexamination, a student test will meet constitutional standards. See, Debra P. v. Turlington, 564 F. Supp. 177 (1983); Brookhart v. Illinois State Board of Education, 697 F. 2d 179 (1983); and Bester v. Tuscaloosa City Board of Education, 722 F. 2d 1514 (1984).

There has been at least one challenge that a testing program would be in violation of Section 504 of the Rehabilitation Act in Southeastern Community College v. Davis, 242 U.S.

397 (1979). The U.S. Supreme Court noted that section 504 does not compel educational institutions to disregard the disabilities of the handicapped. That law requires the handicapped to receive an education, but it does not guarantee a diploma, if the latter is conditioned by the passing of the exam. As an aside, the Education for all Handicapped Children Act does not require education results but the child receives a free public education.

B. Teachers

The situation of teachers is somewhat different in that existing teachers have existing rights. For example, the U.S. Supreme Court in its last session ruled, by 8 to 1 vote, that security officers had a property right in their employment in a school system and that individuals could not be summarily fired even though they had lied on their application and had the truth been known they would not have been hired. Due process of law means that anyone having an existing right must be provided with notice of the charges against him or her and a hearing before the firing takes place.

Yet, we know that every state has statutory eligibility requirements for teaching. Furthermore, one-third of the states require some kind of test for prospective teachers. In 1978, the United States Supreme Court upheld the authority of South Carolina to give all prospective teachers the National Teachers Exam, even though 83% of the blacks who took the exam failed and only 17.5% of the whites failed. See, NEA v. South Carolina, 434 U.S. 1026. The courts will normally look at the question of how to validate the test, meaning is the test related to the goals that are desired, can the test be validated and is the test non-discriminatory. In short, the test must bear a demonstrated relationship to the successful performance of the jobs for which it is to be used.

Now, may I turn to discuss an Arkansas statute which requires the testing of teachers and administrators. All must take and pass a general exam. In addition, one must take and pass a test in the subject area in which one is certified. Next, there is a remediation provision which permits an exam to be retaken within a year. Then, in lieu of the subject area test, six hours of graduate work at a state college or university at a 3.0 grade average on a 4.0 scale can be substituted. Furthermore, Arkansas is going into great detail in having teachers, administrators, parents, experts in the field, professors, etc. used in the development of exams to prove that they are relevant. Will the Arkansas statute pass constitutional muster? It is hard to predict court rulings, but I contend that the Arkansas statute, if challenged, will be upheld. I have come to he following conclusion:

A test for teachers will be upheld if it is:

1) fair, meaning can it be validated;
2) if there is advance notice to all that the test will be required and under what conditions;
3) if there is remediation and provisions for retesting;

4) if there is a hearing procedure before any final dismissal or decertification.

As was the case in testing of students, the reform movement will proceed in developing a testing program for teachers to make sure they are truly qualified to continue in their profession. It appears that this political decision has already been made in most of the states, and it will only take time before implementation follows.

Basic Skills - Integration of Mathematics and Science Into the Teaching of Vocational Education

by Donald Maley

> Humankind has constantly probed the "why" and the "how" of the world about them. It has been a curiosity that has spread light where there was darkness. The "why" and "how" are fundamental in vocational education. In this regard we seek a working partnership that goes beyond curiosity. The goal of the partnership is understanding directed towards individual as well as societal goals for effective participation in the 21st Century.
>
> D.M.

The very nature of education in this latter part of the Twentieth Century is determined by the complexity of the world in which the students must function. The transition from an agrarian society through the industrial society and on to the post-industrial and super-industrial or information age has had an impact on the kind of education essential for understandings that are prerequisite for work as well as citizenship.

The emphasis on understanding is related to the advanced technological world in which one works, plays, lives and contributes. The requirements of the school in such a society must go beyond the memorization of facts, principles, theorems, concepts and formulas. The issue is one of extending the function of the school out of the exercises, routines and abstractions of the disciplines into an interfacing of what is learned with the realities and problems of life, living, and the world beyond the classroom.

A major step forward in this process of extending the disciplines beyond the classroom can be realized through integrating mathematics and science into the many service areas of vocational education. The remainder of this discussion will center around the rationale, significance and processes related to such an integration of these two disciplines into vocational education.

Vocational education, by virtue of its role in the American educational system, as well as its nature, content and methodology, is unique in its potential for integrating mathematics and science in a realistic and meaningful manner.

* It is a form of education directed towards use or application, i.e., learning for use. It is, in essence, learning by doing for the purpose of doing.

* It is a form of education that is dependent on the other disciplines of the school for the means of understanding and interpretation.

* It is a form of education that, in its performance, requires increasing degrees of understanding.

- It is a dynamic form of education fueled by an accelerating, changing technology in practically every area of study.

- It is a form of education that is moving from an apprenticeship based operation to an increasingly knowledge based requirement.

Each of the above statements provides a facet in the overall understanding of vocational education with which one can establish a rationale that would support the integration of mathematics and science as being appropriate as well as a fundamental requirement.

Why the Integration of Mathematics and Science

The issue, as well as the importance, of the integration of mathematics and science into the teaching of vocational education is based on the following ideas:

1. It is impossible to teach anything within a single discipline, if understanding is a goal of education.
2. The education of the workforce in this and future periods of time will require more than technique or assembly and dis-assembly skills. It will require greater and greater levels of understanding based on principles associated with mathematics and science as well as other disciplines.
3. The field of vocational education, through its various service areas, provides an excellent arena for a holistic form of education that provides for the integration of mathematics, science, and the other disciplines in meaningful and applied relationships.
4. The effective integration of mathematics and science into vocational education will provide for and promote a higher degree of acceptance of this vital program on the part of the other elements of the school faculty and administration.
5. There is a movement on the part of vocational education to have vocational courses accepted for mathematics or science courses where there can be demonstrated a considerable use of these disciplines in the instructional program as well as the application phases of the laboratory or field work of the students.

Each of the above points will be elaborated on in the following discussion. Each will be presented in a framework directed towards the importance of and need for the integration of mathematics and science in vocational education.

1. The nature of vocational education in all of its service areas (Agriculture, Business, Distributive, etc.) is by nature a cross-disciplinary experiential form of education. This cross-disciplinary requirement becomes an imperative as the goal of understanding comes to the center. Try, if you will, to develop an understanding (the why and the how) of any process, procedure, or course objective in vocational education without the need to involve several disciplines.

It is an impossible task, yet much of the instruction fails to establish the linkages and relationships that are internal to the experience. Once we move beyond the mere mechanics of manipulation into the realm of understanding -- whether that be in ignition adjustment, construction, planting, associating, evaluating, casting, extruding, analyzing, trussing a roof, laying a footer, adjusting a brake, hammering, sawing, nailing, computing, designing, or printing -- the degree of understanding enters invariably into the realm of the inter-disciplinary.

2. The technology with which vocational education is so inextricably tied is increasingly complex. The miracles of electronics, hydraulics, fluidics, pneumatics, and modern mechanical systems in the workplace put new demands of understanding on the workforce that are unparalleled in the history of humankind. The robotic revolution, the computerizing of our daily living from the home to the work place to the automobiles we drive, the control and maintenance of our elaborate environmental control systems, the life support systems, our numerous entertainment systems, the food processing systems, the automated office, and the newer manufacturing technologies all leave the mechanic/technician or operator of the past naked in the realm of understanding demanded of such persons today. The crude tricks of the trade of the past are no longer sufficient in the present and future technologically controlled and activated work place.

3. The several vocational service areas of the school provide for an exceptional opportunity for the integration of mathematics and science as contributing elements in a holistic form of education. It is here in the vocational laboratory -- whether that be on the farm, in the office suite, or the formal laboratory of the school -- where the parts of the school curriculum come together. It is here where the communication skills, mathematic principles and science concepts are dealt with in practical and applied dimensions. These disciplines come together in the process of improving the student's understanding of his or her vocational education experiences, while at the same time strengthening the individual's knowledge of mathematics and science through using these disciplines in concrete, applied situations.

The holistic dimension of learning is achieved when the parts of the interfacing disciplines are brought together in a meaningful design for learning. This can be one of the great strengths and contributions of vocational education.

The need for holistic designs in education was stressed by Alfred North Whitehead (1952) when he spoke out against the "fatal disconnection of subjects" in our educational programs. He commented as follows:

> The solution which I am urging is to eradicate the fatal disconnection of subjects which kills the vitality of our modern curriculum. There is only one subject-matter for education, and that is Life in all its manifestations. Instead of this single unit, we offer children --

> Algegra, from which nothing follows; Geometry, from which nothing follows; Science, from which nothing follows; a couple of languages never mastered...It is a rapid table of contents which a deity might run over in his mind while he was thinking of creating a world, and had not yet determined how to put it together (Whitehead, p. 18).

Later on in the same writing, Whitehead summarized the need in education by stating that "...The pupils have got to be made to feel that they are studying something and not merely executing intellectual minuets" (p. 21).

The present educational system, with its highly compartmentalized offering in the respective disciplines, has failed to move in a concerted fashion towards helping the learner see or experience a gestalt in the school setting. This tradition of subject matter stockpiling and isolationism is perpetuated by an over-zealous eye toward the protection of turf of the discipline at the expense of education that has meaning, relevance, and application for the learner.

The integration of mathematics and science into the experiential nature of vocational education will require closer ties and linkages with the disciplines. It will require new roles for the teachers in such disciplines. In addition to their traditional classroom role in mathematics, these teachers would ideally serve as the mathematics leaders in the school. Likewise, the science teacher would serve as the science leader in the school.

The issue is educational effectiveness on the one hand and improved vocational education on the other. Both are a part of the central education mission. Just as there is considerable emphasis on education-industry cooperation, it is equally important and valid to have discipline and program cooperation within our schools. Whether one calls it holistic education or the gestalt of education, it is quite obvious that there must be some place in the school where the student can put all the parts (academic disciplines) together in the context of reality and the world beyond the school. Vocational education is especially suited to that role in practically all of its service areas.

4. Mathematics/science integration and the acceptance of vocational education. One of the real challenges vocational education has had and continues to have is that of establishing itself as a vital partner in an academically oriented school system. This condition is due to the traditional perspective on the part of the academic community that fails to grasp the functions of education in a pluralistic society. On the other hand, the vocational community has not moved agressively in the transition from a mechanical/technique, manipulative skill performance based program to that which is knowledge based. The transition to a knowledge based occupational preparation in this latter part of the Twentieth Century is the window into the space of the academic community through which vocational education can enter with relevance, meaning, and a demonstration of validity of its partnership role with education in general.

This can be accomplished by structuring vocational programs that will help the student achieve a greater understanding of the principles, concepts, and theories that are dealt with in the other disciplines and that are considered essential to the educated individual in the years ahead. It is simply a matter of demonstrating that vocational education is a prime partner in the school for developing understandings of mathematics and science in applied settings. The vocational laboratory is, in essence, the real world in which the theoretical can be tested, used, and challenged.

The task that this challenge presents is to bridge the gap that isolates the vocational programs from the disciplines of mathematics and science in thought, attitude and perception.

Hurd (1984), in his paper titled Performing Science Education: The Search for New Vision, stated the need for such bridging of the theoretical and abstractionisms of science in the following comment.

> ...Knowledge is a state of understanding that transcends the learning of isolated facts, definitions, names and symbols. Information becomes useful when it is at the level of a concept, law, principle, generalization, or simply an idea. In most courses, science is taught more as a vocabulary than at a cognitive level that has a potential for critical thinking and application (Hurd, p. 12).

The potential for vocational education to provide the vehicle for moving the concepts, laws, principles and generalizations into the realities of cognitive understanding from which critical thinking and applications may result, is therein concrete, applied and useful terms. This is not a self-serving effort on the part of vocational education. It can be a demonstrated form of partnership towards the common goals of the school, while at the same time increasing the employability potential of the vocational students.

The challenge of acceptance in this case can be based on a fundamental dedication to the enrichment of understanding of science and mathematics. But, in reality, it is more than a challenge of acceptance. It is the challenge of vocational education to achieve the highest levels of understandings of that which the students do, and that with which they work. It is highly consistent with the slogan, "Be all you can be."

A high degree of success in this challenge might provide for a greater portion of centrality in the total school for vocational education.

5. The effort to get approval of vocational courses as substitutes for science and mathematics courses. The recent impetus for state departments of education and local school systems to increase the number of required mathematics and science courses has prompted vocational educators to examine their offerings as possible substitutes for such courses. The hope of such acceptance for vocational programs is highly dependent upon the degree to which the vocational offerings do, in fact, deliver mathematics and science to the extent needed or claimed. There is little doubt that the potential exists for a substantial contribution by many vocational programs. There

is little doubt that the practical application of the theoretical concepts will be more acceptable and understood by many students who flounder and are unable to grasp content taught in an abstract and theoretical context.

The achievement of considerable acceptance of such vocational substitutions will, in a large measure, depend upon:

(1) the organized and integrated inclusion of mathematics and/or science concepts, skills and principles into the program of study and its activities,

(2) the capabilities of the instructional personnel in carrying out such integrated programs,

(3) the priority given such instruction in mathematics and/or science by the vocational teaching personnel,

(4) the collaborative efforts of science, mathematics and vocational staffs to effect or bring about a viable level of student understanding in the diciplines, and

(5) the flexibility of the educational system and its personnel to permit such an acceptance of vocational substitutions.

Frequently, such efforts at substitution are blocked by the discipline area as a matter of pure "protectionism of turf." The educational establishment must move away from the cellular, sole-ownership of content mentality into a form of logic that explores the potential for effective learning of mathematics, science, and the other disciplines regardless of where it happens. It is, in essence, the question of the preservation of the "concept of ownership of content" on the one hand, versus the most effective manner by which the content may be learned. It is essentially a matter of partnership in education based on the fullest and most effective way by which the goals of the school can be accomplished. It is a logic based on the concept of relevance in education as opposed to that of compartmentalism of education.

Some Applications of Mathematics and Science

The field of vocational education, with its various service areas, presents a broad range of opportunities for the integration of mathematics and science. The following are some examples that may be used as illustrative of the previous discussion. These examples may fall under the following categories as appropriate in the vocational laboratory:

1. The process approach.
2. The systems approach
3. The construction approach.

However, it is important to note that these three approaches are not mutually exclusive of each other. There is a great deal of possible cross-over among the categories, depending on whether one wants to isolate a process, study the joined processes in a given system, or deal with a construction that may combine processes as well as systems.

The process approach is concerned with the various processes used by the student in the forming, fabricating, shaping, assembling, joining and repairing of materials or items.

- Turning a piece of stock on an engine lathe provides numerous instances for an understanding of science and mathematics related to: heat transfer, ratios in the gearing, the inclined plane, Archimedes Screw, metallurgical properties of the cutter bit and stock, levers, speeds and feeds, friction, and mechanical advantage.
- Brazing dissimilar metals opens the way for science and mathematics understandings related to: metal alloys, metallurgy, heat transfer, oxidation, concepts of expansion and contraction, gaseous isolation, gas composition, and metal qualities.
- The making of a mould in a foundry class opens another window into the world of science and mathematics such as: sand composition, metallurgy, contraction and expansion of metals, shrinkage control, chilling control, compression of gasses, heat transfer, metal volume calculations, and gas generation.
- Numerous other processes in which science and mathematics may be used in the achievement of greater understanding include:

  boring a hole with a brace and bit
  soldering
  pulling a nail out of wood with a hammer
  pulling a nail with a crowbar
  milling on a milling machine
  taking a picture with a camera
  perparing food
  preserving food
  plating of metals
  spinning of metals
  melting of metals
  extrusion of plastics
  casehardening
  electrical measurements
  calculating material requirements
  electrical circuiting
  land surveying
  etc.

The systems approach involves a major operation or functioning component that has a particular function to perform itself or as a part of a unit comprised of several systems.

The liquid cooling system in an automobile is a classic example of mathematical and scientific principles that can lead to greater understanding on the part of the student. It involves concepts or principles related to: heat transfer, fluid calculations, coolant chemical composition, heat control, bimetal applications, pressure, convection currents, volume in relation to temperature, metallic properties, expansion, contraction, conduction, etc.

Other systems common to the field of vocational education that have rich potential for mathematics and science undertakings include:

electrical power generation
braking system on an automobile
steering system on an automobile
suspension system on an automobile
air conditioning system
plumbing system in a home
plumbing system in a high-rise building
heat control system
ignition control system in a car
communication systems
materials handling systems
irrigation systems
climate control systems
etc.

The construction approach involves the application of mathematics and science in the planning, designing, and constructing of various objects, structures or projects. Such projects may incorporate the previously discussed process and systems approaches. The scope of involvement with mathematics and science is generally much greater and varied. Some examples in this category would include the following:

- The house building project that is so common in the carpentry and building trades classes. This would involve truss design, cost estimating, surveying (using mathematics), floor support calculations, footing design and estimating, materials requirements, landscape design, labor costs, heating and air conditioning calculations, plumbing and electrical design and costs, solar heating design, heat-pump operation and costs, concrete testing, etc.
- A landscaping project in horticulture or landscape class would provide opportunities for science and mathematics applications in: plot design, surveying, draining design, terracing, cost analysis, planting arrangements, labor costs, structure construction, pond design and construction, soil analysis and treatment, and plant fertilization.
- An automobile restoration project would provide numerous process and systems opportunities for the integration of mathematics and science in: cost estimating, welding, cutting, forming, exhaust emissions testing, dynamometer tests, ignition testing, cooling system repair, transmission system maintenance, suspension system repair, electrical system checking and repair, computer functioning, and brake system adjustment.

Other constructions or projects might include: furniture design and construction, patternmaking for casting purposes, die making for stamping or plastics production, robot

design and construction, recreational and public park equipment construction, design and construction of a greenhouse, etc.

The area of agriculture, with the broad field of animal husbandry, presents many and varied opportunities for the sciences, as well as mathematics, to be used. It is difficult to imagine any dimension of agriculture that does not have strong linkages with science and mathematics.

Needed Changes for the Integration of Mathematics and Science

However, in order for this integration to happen, there will need to be some fundamental changes in education that will involve the vocational educators as well as those in the other diciplines of the school.

1. There will need to be a holistic view of the school itself in which the various programs and disciplines of the school are perceived as partners in the process of education. Each must dedicate their respective disciplines and efforts toward the fulfillment of the promise within every student, irrespective of whether he or she is in a vocational, academic, or any other form of program.
2. The vocational teachers, as well as the teachers of the academic disciplines, will need to broaden their perspectives and understandings with regard to the nature of content and potential in other areas of the school. They must learn to reach out beyond the walls of their classrooms and laboratories.
3. The vocational teachers, working with their colleagues in mathematics and science, must take their procedures and techniques for developing competency-based instruction and move it into the broader area of applied and theoretical constructs involving these other disciplines.
4. The vocational teacher's role will require an extension of his or her perspective beyond the traditional student tasks of how to operate, repair, maintain, construct or assemble. It will require a knowledge of the principles and concepts related to mathematics and science and how these disciplines may be integrated into the assignments, activities, and instructional elements of the program.
5. Vocational teacher education, as well as teacher education in the disciplines of mathematics and science, will require some basic changes. A major goal of teacher education will be to develop the concept that the schools exist for all children, irrespective of program, and that mathematical and scientific undersandings are uniquely vital components of the education of each.

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Basic Skills and Vocational Education
By Dewey Allen Adams

The Animal School
Fable for School People

The Administration of the School Curriculum With References to Individual Differences by Dr. G. H. Reavis, Assistant Superintendent, Cincinnati Public Schools

* * * * *

Once upon a time, the animals decided they must do something heroic to meet the problems of a "a new world." So they organized a school.

They adopted an activity curriculum consisting of running, climbing, swimming, and flying. To make it easier to administer the curriculum, all the animals took all the subjects.

The duck was excellent in swimming, in fact better than his instructor; but he made only passing grades in flying and was very poor in running. Since he was slow in running, he had to stay after school and also drop swimming in order to practice running. This was kept up until his web feet were badly worn and he was only average in swimming. But average was acceptable in school, so nobody worried about that except the duck.

The rabbit started at the top of the class in running, but had a nervous breakdown because of so much make-up work in swimming.

The squirrel was excellent in climbing until he developed frustration in the flying class where his teacher made him start from the ground up instead of from the treetop down. He also developed "charlie horses" from overexertion and then got C in climbing and D in running.

The eagle was a problem child and was disciplined severely. In the climbing class he beat all of the others to the top of the tree, but insisted on using his own way to get there.

At the end of the year, an abnormal eel that could swim exceedingly well, and also run, climb, and fly a little had the highest average and was valedictorian.

The prairie dog stayed out of school and fought the tax levy because the administration would not add digging and burrowing to the curriculum. They apprenticed their child to a badger and later joined the groundhogs and gophers to start a successful private school.

Does this fable have a moral?

* * * * *

"Back to the basics" in recent years has become a cry by many with an urgency and emotion reminiscent of "Remember the Alamo" in the early 1800s. The major contrast may be that we're not together with respect to what we mean by the basics and even less sure of what would be required to provide the proper focus upon basics in our schools. What may be

more promising is an adequate treatment of those basic skills and understandings, both general and vocational, which are already in place in most of our school curriculum.

Many of the current studies of excellence in public education have referred to the need for emphasis upon general and basic education. Such studies as The Paideia Proposal; High School: A Report on Secondary Education in America; High School and the Changing Work Place; The Employer's View and Action for Excellence were among the efforts to influence the return of greater emphasis upon general and basic education in American schools.

Perhaps A Nation at Risk (1983) has been the most popular and influential of such studies and thus we cite its treatment of the basics as a "jump off" point for our comments. A Nation at Risk identified five areas considered to be basics: English, mathematics, science, social studies and computer science. It was recommended that graduation requirements in all high schools throughout the nation be strengthened in these five areas. Such strengthening was urged even if it resulted in less emphasis upon some of the liberal arts, music and vocational subjects.

This focus upon five subjects as the basics appears to be unduly narrow and could result in increased dropout rates and elimination of many of the more applied subjects in our secondary schools. Thus we wish to offer a broader range of candidates for the area called the basics and consider how this broader focus might not only enhance general education activities in our schools but also enhance the applied fields such as vocational education which are a central concern of this colloquium today. We will also suggest some implications of this broader approach to the preparation and inservice education of vocational teaching personnel.

Basics Can Apply to Applied Subjects Too

It would seem that basic knowledge and skill might be relevant and meaningful to a greater number of the subject areas which are found in the contemporary high school. For example, one might consider the following a more adequate listing:

1. Reading, writing and computation.
2. Speaking, listening and interpreting.
3. Thinking, deciding and relating.
4. Designing, constructing and marketing.
5. Planning, promoting and assessing.

These are really 15 basic skill areas and they cut across general, liberal and applied arts. But they are basic to much of what human beings do in life -- all aspects of life.

Research and Basic Skills for Vocational Education

Now before we get too far afield in new and creative areas, let me review some of the

things we know from research about basic skills in relationship to vocational education students. Let us also reveiw some of the reasons that basic skills, however defined, are important in relationship to vocational education. Following these considerations, we might share some examples of new developments in the basics in vocational education settings. That should be just enough standard treatment of our subjects to allow us to return to a bit of creativity and close with some "far out" notions and challenges to set the stage for more than just standard comments and questions during the discussion period.

Basic Skills and Participation in Vocational Education

A number of recent studies have examined the association between vocational education and the attainment of basic skills. The National Center (Lotto 1983 and Weber et al. 1982) in fact has reviewed and reported on this body of literature. Five of the findings which relate to our concerns here today are the following:

1. Compared to academic students, vocational students are less proficient in the basic general education skills but are about equal in this respect to the general track students. Time devoted to general studies could be a crucial factor in this statistic.
2. Basic skill attainment of secondary vocational students tends to vary according to programs or service fields. Some vocational fields devote considerable more time to skill development than others.
3. Basic skill proficiency appears to be related to such outcomes as salary, employment area and employment level.
4. Business and education officials perceive quite differently the nature and level of skill deficiencies among high school youth entering the work force (Center for Public Resources 1982).
5. Nearly two-thirds of the responding companies note that basic skill deficiency can limit severely the job advancement of secondary school graduates (Center for Public Resources 1982).

Basic Skills as Part of Vocational Education

Most business and education leaders, including vocational education specialists, consider basic skills to be of paramount importance to success in modern society. Recent stress upon high technology and related advances in science have served to intensify this feeling. Competency in the basic skills can assist employees or workers to:

1. Find solutions to work-related problems.
2. Increase productivity and quality of product or services.
3. Attain upward mobility on the job (Lotto 1983).
4. Assist associates to improve job skill and competence.

5. Improve work habits and thus enhance the public image of the organization.

Because basic skills are considered so crucial in the work place, vocational educators must consider their inclusion in all aspects of the curriculum. A number of research studies have reported that higher payoffs from vocational training can be expected when basic skills in both general and vocational subjects are related. Vocational educators thus look for ways in which these relationships can be enhanced (Campbell-Thrane et al. 1983). Cooperative education has been one of the more common strategies employed by vocational education to keep this relationship strong and viable.

Examples of Basics and Vocational Education

Let us now consider five examples of the basics being renewed in vocational education in America.

1. Last autumn, the Charlotte-Mecklenburg School System in North Carolina instituted new admission standards for selected trade programs and eliminated courses that had in the past led to poor job-placement prospects.
2. The Manufacturer's Association of Erie, Pennsylvania, is now one of several hundred business and industrial groups in the United States which is reviewing local secondary school vocational courses to ensure that the curriculums are relevant, up-to-date and responding to community job needs.
3. The Great Oaks Joint Vocational School District in Cincinnati, Ohio, has unveiled a curriculum which presents more thorough coverage of the principles of math and science which undergird all vocational education. Some four years ago the system's superintendent, Harold Carr, had noticed that graduates of Great Oaks' programs were not as upwardly mobile as other workers in the area. Students never seemed to achieve a full understanding of their chosen occupational field. Thus far the new approach is meeting and exceeding expectations of school leaders associated with the program.
4. An approach similar to that of Great Oaks is being tested in at least two high schools in each of 28 states as part of a national Principles of Technology Program. This approach will require that vocational students master at least 13 physical concepts such as force and resistence, and understanding their application to the world of work (Solorzano 1984).

These examples of new and expanded approaches with basic skills and vocational education could be described in many other school districts and business communities throughout America. Educators, both general and vocational, have indicated that students seem to prosper from these approaches to competency development. As several education leaders from Prosser to Barlow to Gardner have echoed through the years: "We believe that society benefits greatly when both our pipes and our philosophies hold water."

Summary and Conclusions

Research and practice point to basic skills as a much needed and feasible aspect of vocational education. Properly identified, taught and applied they can enhance general literacy, upward mobility, greater productivity, quality products and services, and continued education and growth.

All of the recent studies on excellence have recommended that greater attention be given to the basics. Even The Unfinished Agenda which called for attention to vocational education, generally neglected in other studies of excellence, noted that secondary vocational education should provide instruction and practice in the basic skills of reading, writing, arithmetic, speaking, listening and problem solving. Consistent with our previous view that the basics should go beyond those of general education, The Unfinished Agenda addressed the current demand for the new basics without locking students into the academic classroom. Emphasized in the report by the National Commission on Secondary Vocational Education was the diversity in vocational education approaches needed for local, district and regional needs. A variety of innovative vocational education approaches are needed to reach and accommodate the wide differences in student populations. Educational excellence, including that related to the basics, may in the final analysis depend more upon our ability to respond to the unique needs and interests of each student than upon our determination to assure each student of a common educational experience.

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Employability Skills—Basics for Employment: "Keeping the Job"

by L. W. Stewart

Thank you for the opportunity to speak for industry in general and also for Wyle Laboratories concerning what we see as imperative to meet the challenges of new technology.

Wyle Laboratories serves the total spectrum of technology across the nation through four divisions in 30 locations in 14 states. From our corporate headquarters on the Pacific to our branches on the Atlantic we are confronted daily with otherwise excellent employees who were ill-prepared in the classroom to cope with the fundamentals of the work place. We are typical of the new technology industries and our experiences mirror those of almost all other industries with which we're familiar.

We in busines and industry are the prime users of your products. Yet all too often our public schools convey the impression that their only customers are private liberal arts colleges. Therefore, as a representative of business and industry, I am delighted to be able to speak for those of us who are consumers for the other 90-plus percent of your output.

I grew up during the Great Depression. Looking back on it, I think I was fortunate to have grown up then because a young lad of that era learned young, and learned fast, about the world of work. And you learned it pretty close to home.

Indeed, most of what I know about the **work ethnic** I learned either at my father's knee, or over my father's knee.

My father didn't know much about the various jobs I worked at, but he was a gold mine of information on how I should go about working for my bosses.

What he knew instinctively, and what I want to talk about with you today, is core occupational basics -- those attributes outside of specific occupational skills that it takes to keep a job.

In the last couple of years there has been a flood of studies which have concluded that we need more excellence and more basics. These studies then go on to describe what the basics are. Most of these definitions have been pretty much on target, at least as far as they went. But there's the rub. They didn't go far enough.

Down on the Virginia Peninsula, we went a step further. The thought occurred to us that business, industry, and government were the prime users of education's product, and that the consumer is probably a pretty authoritative resource for product improvement.

We therefore asked business, industry, and government what they thought the basics ought to be, and we added their inputs into the definitions we collected from the various studies.

We've played around with this survey for about 15 months now, and we're encouraged by the results.

First, business, industry, and government agree that reading, writing, and arithmetic are still very important. However, business, industry, and government have identified ten

additional basic skill areas which they consider to be equally important. Furthermore, while our definitions are clearly written with industry in mind, we find that they are equally important to both workforce-bound and college-bound students.

We on the Peninsula believe that our schools should prepare our students to be good citizens, to be good members of family units, and to be economically self-sufficient, either individually or as team members. Economic self-sufficiency has something to do with the world of work. Therefore, business and industry feels strongly that all students should possess certain core occupational basics which will help them enter the work place smoothly.

My first handout is about the twentieth draft of our efforts to define these core occupational basics. And we are not finished yet. Every week some new ideas emerge. What you see before you is where we are today.

As you scan the list, you will recognize that our basics are voluminous and tough. They're voluminous and tough because that's what's required. We don't apologize. You have 13 to 17 years to impart these basics to high school or college graduates. I honestly don't believe you can present a legitimate case for why it can't be done.

Where and when and how these basics appear in curriculum is what you are the experts at. Industry doesn't care so long as they appear someplace and are a condition of graduation.

This list of basics is a master list from which more specific definitions may be derived for specific occupations. While the nature of these basics is fairly universal, this list can be edited according to whether a student opts to be a philosopher, policeworker, or plumber. Consider our list as a starting place.

With that as background, I'd like to share with you some selected thoughts on these core basics. I'll hit only the highlights. I urge you to dig more deeply into the list at your leisure.

Leading the pack, of course, are **reading, writing, and arithmetic.** I'll not dwell on these except to make one point with respect to mathematics. And the point is this: "As our young people become more and more dependent upon calculators and computers, they begin to lose control over the calculation process. As they become hostage to the computer chip, they forfeit the power to evaluate the reasonableness of the answer produced by the machine."

Our young people must have well-honed mental calculation skills, so that they are never victimized by a calculator and cannot estimate an answer for the purpose of checking its reasonableness.

We also believe that all workers should have a solid familiarity with **scientific methodology.** Clearly the best way to learn this methodology is in an applied mode. While for many students it is easy to carry the principles of reasoning and problem solving from the classroom to the laboratory, for other students it is the other way around. They solidify their appreciation for reasoning in the laboratory and carry it back to the classroom.

Later on down the list, you'll see that we place a rather high premium on reasoning, problem solving, and decision making. We believe that the scientific methodology is a major supplement for those mental processes.

We have included **sociology and civics** in our list of occupational basics. We don't believe that a worker can exist in the workforce in isolation from the forces which shape heritage and which shape responsibility as a citizen. Perhaps including these two items is merely symbolic of industry's rising social consciousness, but I think it goes deeper than that. I think it says that the worker is not complete unless an appreciation for history and citizenship is an integral part of the worker's makeup.

If sheer volume were the sole criterion for curriculum, then **listening and speaking** should be the major courses in school. Listening, not reading, is the primary process for inputting the brain, and speaking, not writing, is the primary process for outputting the brain.

Preoccupation with reading and writing is understandable, and I am not proposing tradeoffs. What industry is telling you, however, is that our schools' graduates should be equally or more proficient in the primary means of communication than in the alternative means. The primary means of communication is oral communication.

Knowledge and skills without reasoning to put them together, are like numbers without mathematics to put them together -- not very useful. Accordingly, we think it essential that our schools teach their students how to reason, how to solve problems, and how to make decisions.

It's sad to see young people wander aimlessly because they lack command of the reasoning process. Common sense is not something that's instinctive. Good judgment should be the product of reasoning, problem solving, and decision-making. In far too many cases, however, our young people suffer the consequences of bad judgment before they learn good judgment -- simply because they had not learned reliable techniques of exercising judgment.

For these reasons, it makes good sense to educate all of our students in **reasoning, problem solving, and decision-making.**

There is no doubt in my mind that the overwhelmingly greatest cause for new workers getting fired is failure to maintain satisfactory interpersonal relationships with their supervisors and co-workers.

In theory, one of the most highly transferrable attributes from the classroom to the work place should be **interpersonal relationships**. The student who has been supervised by teachers and surrounded by peers, becomes a worker who is supervised by bosses and surrounded by peers. It should be a smooth transition. But it isn't.

Very frankly, I think we have some serious problems in our schools concerning the development of satisfactory interpersonal relationships. I think it deserves your priority attention.

Our next basic is **employability**. Schools seem to be doing a credible job of teaching vocational students how to fill out resumes and how to undergo the interview process.

But job seeking skills aren't enough. We feel that the entry level worker needs to have some background concerning employment itself. In particular, the entry level worker must understand that the job description is fixed. It's the worker that's the variable, and it's the worker who must adjust to the work.

The first day of work is like the first day of school. The one who's been tipped off ahead of time is less likely to experience the shock of the unknown.

New workers should arrive at the work place with a working knowledge of **entrepreneurship**. In a few cases, the new worker will be going into work for him or herself, and entrepreneurship is an imperative. But that's not what I'm talking about. The need is for workers to understand what business is all about, so these workers can comprehend their roles in the scheme of things.

I am particularly proud of the research we have done on **work ethics**, and I would urge you to read the paragraph thoroughly.

What we are trying to do under work ethics is express the "corporate culture of the work place," but we find that we are also expressing the ideal corporate culture of the classroom.

That these corporate values are difficult to teach does not justify their exclusion from curriculum. Further complicating the problem of teaching these values is the fact that the best learning will take place through exemplary role models, and you may have a problem in this regard.

Years ago, job stability was common. Today, job mobility is the mode.

The key to accommodate this occupational mobility is **adaptability**, or the capability to roll with the punches. It is no longer enough that the graduate be prepared to enter the workforce the first time. The worker must also be prepared to switch horses several times in a career. The attitudes and skills which can help this transition should be nurtured in school. **Flexibility** is the name of the game, for the worker must adjust to the work place.

Let me illustrate. At Wyle Laboratories as in most other places, the output mechanism for a computer has gone from 1,600 square feet 40 years ago to 50 square feet 20 years ago to a table top 10 years ago to the corner of a desk today.

Yet the input mechanism, a keyboard of some sort, is very much today as it was 40 years ago. That's because the human hands are very much today as they were 40 years ago.

It is through the operator's hands on the keyboard that the computer is activated, and it is through the operator's brain that data must pass to tell the hands what to do.

The point is that education must not become so fascinated with the output mechanism, that it forgets what makes the input mechanism work. What makes the input mechanism work is a human being, and that human being must be adaptable enough to perform the ultimate functions of the catalyst between the demand for technology and the hardware which meets that demand.

Let me give you the flip-side of the same coin. Also at Wyle Laboratories we have

equipment which ranges from tomorrow's state-of-the-art to some which is 40 years old. We have technicians working on equipment that was put in operation 20 years before they were born. Folks, it takes adaptability to shift gears like that.

So much for the basics, because I want to budget part of my time to the essential ingredient of the process for transmitting occupational basics from the consumer to the producer. The fact is, you presently do not have a very effective process for doing that.

Your current process for determining what your students need is to ask a teacher or ask a student. It shouldn't surprise you that your teachers think that what their students need is what they're teaching right now and no changes are necessary. It shouldn't surprise you that what your students think they need isn't based upon very much experience in the work place. At any rate, you assess the marketplace through a bunch of selective listeners and ask an advisory council to lend some dignity to the results.

My friends, that's how one Henry got the "Edsel" and how another Henry got the "Henry J." The fallacies in their processes resulted in financial disaster, because their customers had the power to reject their self-serving thinking. The fallacies in your processes have fared better, because the public really doesn't have much clout in expressing their disapproval when you educators decide to stonewall it.

However, times are changing, and business and industry are organizing to have a say in what goes on in our public schools. We feel that you should be astute enough to realize that market research is imperative and to figure out a way to go about it. But if you don't, the tea leaves say you are going to get some unwelcome help.

My point is that you need to get on about the business of finding some way to transmit the needs of the work place to the classroom so that your students can better make the transition from the classroom to the work place.

Here are some ideas! For several years now, we on the Virginia Peninsula have experimented with a structure and a process for being the crosswalk from industry to education and vice-versa. We think we have a workable formula, and it goes something like this.

First, industry-education collaboration must be collective and regional. Businesses do not want to deal separately with a community college and several school divisions in an area.

Second, it is essential that the forum for collaborative action be a collaboration council made up of the movers and shakers of regional industry and education. Industry should provide vice presidents and above; education should provide heads of institutions.

Third, there must be a medium of communication. Comprehensive minutes of meetings help. But there must also be a medium of communication dedicated exclusively to occupational data. All the rhetoric in the world isn't worth a hill of beans unless the ultimate users of data have access to written information.

On the Virginia Peninsula we have formed an industry-education collaboration council

called the Virginia Peninsula Vocational Training Council. My second handout describes the Council and what it does.

We are regional. We include 400 square miles from midway down the Peninsula to the ocean.

Our forum for communication has 33 members and an Executive Committee of 11.

Our medium of communication of occupational information is called a "Forecast of Occupational Demand," and that is described in the handout.

We have hired permanent staff, because without it the Council is just another committee that meets to exchange rhetoric. The Council is funded half by industry, through the Virginia Peninsula Economic Development Council, and half by education.

If you want effective collaboration, you must have an effective mechanism for collaboration. Our concept isn't perfect, but it's the best game in town.

Last year I co-chaired, with an educator, the Virginia State Task Force on Vocational Education for Economic Growth. One of the grumbles from industry representatives was "Hey, we serve on these committees over and over, we tell educators the same things over and over, and they don't want to hear it." So we made a deal with the Department of Education. The deal was along the lines of, "either accept and support a recommendation, or explain in understandable terms why you don't want to." We gave them 15 recommendations. As of now, a couple of motherhood and apple pie recommendations have been supported. As for the rest, there has been no real feedback. The report appears to be gathering dust on a shelf somewhere down in Richmond, where they're making policy to educate the children of those of you who live in Virginia.

Across the nation, industry is learning a bitter lesson from this and countless other experiences like it. The lesson is that excellence in education will continue to be defined by academicians, regardless of what the public they serve has to say about it. Industry's recourse is to apply its clout elsewhere.

Folks, it's been my pleasure to share some thoughts with you concerning core occupational basics and the mechanics of transmitting these basics from industry to education.

Business learned long ago that it can't survive in isolation from its market place. We've developed sophisticated market research to determine the real needs of our customers, because when we fail to satisfy our customers, they usually go someplace else.

For a variety of reasons, education seems to operate in isolation from its consumers. The international marketplace, however, is going to force us as a nation to make the best use of all our resources, and no turf is going to be sacred, especially public turf.

The international marketplace is a tough arena, and the United States is slipping. A major characteristic of our greatest competitors is education systems which are designed with economic growth in mind. These countries have found a balance between academic excellence and occupational excellence for their schools. If we are to achieve a competitive edge in the international marketplace, we must likewise strike such a balance.

We believe you have a way to go in your market research. We also believe you do very well at what you think you are supposed to do. Some good research will help you considerably in determining the direction in which you want to go.

One final thought. The sequence for integrating core occupational skills into educational programs should be:

One -- determine through market research what business, industry, government, and institutions of higher learning expect in terms of occupational basics and specifics.

Two -- develop curriculum accordingly.

Three -- adapt teachers to the curriculum.

All too often you do it backwards. Teachers change curriculum because they convince themselves that it should be changed, and, in three years they've changed their courses around to just exactly what they enjoy teaching most. Then you run a completed three-year vocational training plan under the noses of an advisory council during a luncheon, and get their rail-roaded approval. Then you say you've collaborated with business and industry.

Dr. Whate said I should "lay it on the line" for you, and I have tried to do so reasonably tactfully.

My final attempt at tact is this:

Recently the public has scorned industry because we charged the Defense Department $700 for toilet seats. Now I'll admit the price was outrageous. But at least our product performed the function advertised and quality was not an issue.

Educators, your product costs $25,000 to $65,000 and up per copy. Unlike our toilet seats, price is not at issue, because the public has shown you time and time again that it will pay for quality education when you can demonstrate that you're providing it.

What is at issue is quality, and I suggest that a good place to start is with the basics.

It's been my pleasure to participate with you today in what I hope has afforded you better insights as to how industry sees these basics, not only for finding the job, but also for keeping the job.

VIRGINIA PENINSULA VOCATIONAL TRAINING COUNCIL

CORE OCCUPATIONAL BASICS

The Virginia Peninsula Vocational Training Council (VPVTC) believes that all high school students, college-bound or workforce-bound, should be appropriately versed in certain core occupational basics The VPVTC believes that all students should have the fundamental competencies necessary for them to be good citizens and members of family units, and that they should also have other basic competencies according to their chosen career pursuits. The VPVTC believes that core competencies or skills can be defined to fit almost any occupation or college major and that education can work these competencies into the curricula where they best fit. The business/industry community is not concerned with where specific competencies fit into the curriculum. It can be in the classroom, in the lab, or some in non-academic context. What is important is that they appear somewhere While specific definitions of core occupational basics would be different for those who aspire to be philosophers or be policemen, or be plumbers, the VPVTC believes that a master list of competencies can be tailored to each occupational area. There is nothing easy about the list However, the public schools have thirteen years to impart those basics expected of high school graduates, and the colleges have two to four or more years to impart the basics expected of community college or university graduates The VPVTC master list of core competencies or basics is as shown below:

1. READING: The ability to identify, comprehend, and retain the primary and supporting ideas in written works. Can comprehend and classify the thoughts expressed in all forms of publications, correspondence, and instructions associated with an occupation. Can comprehend the meaning of collective passages, not just words and phrases. Can grasp the primary and peripheral thoughts in a document and summarize the ideas effectively. Can distinguish facts from assumptions and opinions, can recognize styles of writing according to purpose, and can interpret inferential and implicit content as well as literal and explicit content, and can identify inconsistencies within written works. Can vary the process of reading according to the nature of the material, the purpose for reading, and the degree of absorption required. Comprehends the written vocabulary of the particular occupation and the general occupational environment. Can define unfamiliar words by decoding, by using contextual clues and by using a dictionary. Can read objectively, evaluate the objectivity of resources, and verify written information Can comprehend, retain, and follow written directions and instructions. Can use effectively the features of written materials such as the table of contents, preface, introduction, index, titles and subtitles, and interpret correctly the data contained in visuals, graphics, charts, and schematics. Knows how to access the libraries appropriate to the occupation

2. WRITING: The ability to express and relate ideas clearly and coherently in writing. Can conceive ideas and state them clearly, correctly, and concisely in writing. Can prepare forms, applications, instructions, directions, memoranda, records of events, proposals, summaries, letters, briefings, reports, and technical or non-technical literature appropriate to the occupation. Can gather, select, organize, and relate information and ideas in a logical and coherent written form. Can produce standard English writing with appropriate word choice and correct structure, grammar, punctuation, capitalization, syntax, and related writing mechanics. Can write legibly and neatly by hand. Can vary writing style, including vocabulary and sentence structure, for different readers and purposes Can edit written work. Can gather information from primary and secondary sources, and write a report using such research Can quote, paraphrase, and summarize accurately and cite sources correctly. Can write in such a manner that the finished written product constitutes irrevocable accountability for what is communicated in that manner.

3. MATHEMATICS: The ability to make quantitative calculations, estimates, and measurements and apply quantitative perceptions to solve problems. Can calculate with reasonable accuracy the computations of addition, subtraction, multiplication, and division using natural numbers, decimals, fractions, integers,

roots, and powers. Can express ratios, proportions, and percentages. Can solve algebraic equations and geometric problems. Can calculate distance, weight, area, volume, and time, and use quantified information from charts, graphs, and tables. Can produce precise or approximate mathematical computations and judge the reasonableness of the results. Can select and use appropriate mathematical tools (mental calculations, trial and error, manual techniques, calculators, and computers) to formulate and solve problems in quantitative terms. Can calculate resources, time, and costs relevant to specific tasks. Can apply simple probabilities and statistics. Can support ideas quantitatively or statistically using mathematical techniques appropriate to the subject. Can calculate costs and related charges and taxes, add up bills, receive various forms of payment, and make accurate change. Can apply mathematical processes to consumer economics. Can convert between traditional and metric systems. Can quantify otherwise incomparable ideas for the purpose of comparison.

4. SCIENCE: The ability to recognize and resolve problems through application of basic scientific principles. Can recognize problems the genesis of which is in mechanical, physical, chemical, or biological science, and understands the specific scientific principles underlying them. Can apply the scientific methodology by formulating and stating hypotheses and then evaluating them by observation or experimentation.

5. SOCIOLOGY: An appreciation of the contemporary society in terms of the heritage which has shaped the past and present and which will likely give form to the future. Comprehends one's own heritage through an understanding of the people, ideals, technology, politics, social, and ethical issues and of foreign and domestic successes and failures throughout history. Understands the relationships among past and present populations and comprehends one's place in an interdependent world. Recognizes the social and cultural aberrations which disrupt the continuity upon which the human experience depends.

6. CIVICS: An appreciation for the function of government and the roles of its citizens. Understands the forms and functions of governments, especially municipal government, and comprehends the roles of citizens as the proponents and beneficiaries of government. Knows the distinctions between United States political systems and those of other countries. Comprehends the principle of separation of powers among the executive, legislative, and judicial branches of government. Understands the relationship between civic responsibilities and civic rights and entitlements. Knows the distinction between liberty and license, and respects the need for statutory authority. Appreciates the tradeoffs upon which the benefits of democracy are dependent, and understands how collective and special interests are integrated.

7. LISTENING AND SPEAKING: The ability to identify, comprehend, articulate, discuss, and report accurately the principal and subsidiary ideas in a spoken exchange; the ability to ask and answer questions coherently; the ability to follow spoken instructions; and the ability to recognize and to clarify misunderstandings. Can engage constructively in the exchange of spoken ideas, and can understand the details and intent of spoken communication. Can identify the main and subordinate ideas in discussions and report accurately what others have said. Can conceive and develop ideas about a subject, organize those ideas, and present them clearly in standard oral English. Can participate objectively and effectively in discussions. Can present oral reports and briefings accurately and succinctly in the language of the particular occupation. Can receive and comprehend oral instructions which may be sequential and given in rapid succession, and carry them out as instructed. Can give oral instructions in a manner which facilitates correct compliance. Understands how ideas can be distorted and how the accuracy and reliability of oral messages can be tested. Knows how to recognize lack of understanding and how to obtain clarification and feedback. Can obtain, clarify, and verify information through questioning. Knows the effects of tone and voice, attitude, and body language on oral communication, and knows how to vary spoken language to suit different situations. Knows telephone procedures and protocols appropriate to the occupation. Exercises oral communication beyond mere spoken exchange culminating in genuine understanding.

8. REASONING, PROBLEM SOLVING, AND DECISION MAKING: The ability to gather and interrelate facts and other inputs to identify, conceptualize, and recognize the implications and significance of problems, and to resolve problems through analysis, conclusions, recommendations, and decisions. Recognizes as a problem the inconsistencies between the way things are supposed to be and the way they are, and initiates problem solving to resolve the situation. Identifies and grasps problem areas and senses the nature of

decisions required to solve problems. Sifts through details to isolate the heart of problems, calculates and weighs facts and other inputs, and makes logical and practical decisions or recommendations. Distinguishes among facts, assumptions, and opinions, between cause and effect, between inductive and deductive reasoning, and recognizes strengths and weaknesses in the reasoning process. Can grasp, comprehend, develop, and use concepts and generalizations. Can use rational analysis in place of factual recall to solve problems. Uses rational decision making tools to include objectives, facts, assumptions, generalization of the problem into manageable proportions, risk and benefit criteria, development and description of alternatives, comparison of alternatives, findings, conclusions, and recommendations. Relates old and new knowledge and experience and those of others to job performance. Uses the powers of reasoning to transfer old knowledge, concepts, and principles to new or unanticipated situations. Knows how to evaluate decisions and how to change behaviors to adapt to decisions. Can develop logical steps to implement decisions.

9. INTERPERSONAL RELATIONSHIPS: The ability to relate appropriately and effectively with other people in an occupational or social role. Strives to develop good working relationships with associates and to demonstrate behaviors appropriate to and customary in the workplace. Understands the value and function of courtesy, compassion, fairness, humor, and positive attitude in human relationships. Can anticipate, detect, and comprehend the thoughts and feelings of others, and can communicate one's own thoughts and feelings in a manner compatible with others' sensitivities. Recognizes the total range of interpersonal styles and recognizes those factors within various styles which determine human behavior. Has the versatility to make temporary style changes to meet situational demands. Comprehends the need to adjust one's style to the legitimate expectations of those in positions of authority or those entitled to accommodative treatment such as customers, clients, patients, guests, etc. Comprehends the legitimate expectations of peers and subordinates and acts accordingly. Knows how to deal with conflict or criticism in a rational, productive manner. Manages interpersonal relationships in a negotiative mode rather than that of either authority or subservience. Understands team synergy and contributes positively to fostering group dynamics. Understands the destructive consequences of stereotypical biases and prejudices on human relationships and understands one's own place among others who differ. Understands the basis for the thoughts, feelings, motivations, and behavioral styles of others and interacts accordingly. As an entry level employee, fresh out of the classroom, understands that there is a lifetime of practical experience which is as yet unrevealed to the apprentice, and that judgment and maturity is a function of both education and experience. As a seasoned employee, understands that sharing of experiences is constructive for all parties.

10. EMPLOYABILITY: Knowledge of the procedures for obtaining employment and an understanding of the components of work such as compensation and legislation. Knows how to prepare resumes and applications and is capable of participating in the interview process. Comprehends the relationship between job specifications and personal characteristics and knows how to develop competencies to match the requirements. Is familiar with the various public and private employment services and agencies, particularly tax supported organizations, which exist to assist citizens with employment matters. Understands fair labor standards and regulations, and understands the history of labor legislation in the United States. Understands the principles of compensation to include pay, benefits, perquisites, and intangibles. Knows how to apply for admission to postsecondary and proprietary schools.

11. ENTREPRENEURSHIP: An understanding of the fundamentals of capitalization, organization, management, productivity, profitability, risk, and competition as they apply to product or service businesses or enterprises. Understands the basic economic systems of the United States and other countries, and their relationship to employment. Understands the fundamentals of economics to include the function of money, capital investment, risk, productivity, demand, and supply, compilation, pricing, margin profit and loss, and the distinction among corporations, partnerships, and proprietorships. Understands the roles of business, industry, government, and labor in economic development and growth, maintaining employment, creating wealth, and raising the standard of living. Comprehends the need for structure and organization in an enterprise, and the roles of management and labor in conducting business. Understands management for results and accountability for results. Understands goals and objectives, functions and tasks, effectiveness versus efficiency, and the relationship among input, process, and output. Understands the role of labor in relationship to productivity and profitability, and in particular the phenomena of

skills, knowledge, competencies, and performance standards in relationship to productivity. Comprehends rudimentary bookkeeping, accounting, cash flow, cost accounting, and taxation, particularly as a catalyst for understanding of profit and loss Comprehends the relative advantage of the customer or client as regards choice of vendor, and the role of the employee in influencing that choice

12. WORK ETHICS: Demonstrated ability to adapt one's behaviors to the regimen of the workplace Understands and respects the need for and function of organization structure, supervision, authority, values, policies, procedures, rules, schedules, deadlines, and performance standards, and understands the implications of the essential relationship and dependency between supervisor and subordinate. Understands in principle that the function of subordinates is to help the supervisor achieve the goals for which the supervisor is responsible Recognizes that while education and experience are mutually supportive, experience generally affords an appreciation for patterns of the realities of the occupational environment, patterns which may not be discernable to the inexperienced. Accomplishes assigned tasks with or without supervision. Is a self-starter who finds work to do without being told and seldom wastes time; in the absence of instructions, exercises initiative to accomplish what likely would have been covered by such instructions Can set goals or interpret supervisor's goals and make realistic plans and take actions and set priorities to meet them. Is resourceful and uses ingenuity to meet challenges. Concentrates diligently on the job to be done. Does not discourage easily, and perseveres through difficult tasks until completion. Takes challenges in stride Performs reliably as an individual and as a cooperative team member Demonstrates integrity, honesty, loyalty, and respect for the values of the organization. Exhibits a sense of pride in quality craftsmanship or service and demonstrates a positive attitude toward excellence on the job Possesses good work habits and maintains equipment and work stations in good order. Demonstrates respect for dependable attendance and punctuality, and notifies supervisor promptly of impending tardiness or absence. Can cope with multiple roles and responsibilities of life and can balance personal and professional demands. Understands, respects, and observes safety regulations and procedures. Displays maturity and good judgment concerning safety and similar workplace discipline. Exhibits healthy regard for the human dignity of clients, supervisors, peers, subordinates, and others encountered in the workplace Has a positive attitude toward one's self. Possesses assertiveness and self-confidence. Is enthusiastic and zealous, and demonstrates desire and willingness to learn and improve. Can distinguish between legitimate mistakes associated with initiative and trial and error, and errors of omission or commission associated with carelessness, inattentiveness, apathy, or incompetence. Understands that organizational and individual growth is obtained through constructive criticism, and has objective attitude about receiving criticism from supervisors and other employees Sees self as part of total productivity and self-evaluates personal contribution to the team effort. Neither underestimates nor overestimates one's personal value or importance to the total operation. Maintains standards of appearance, dress, grooming, and personal hygiene appropriate to the nature of the business and to co-workers. Maintains levels of nutrition, health, and physical conditioning appropriate to the occupation, to include avoidance of substance abuse, and copes effectively with the stresses and strains peculiar to the occupation. Accepts and seeks out responsibility Understands the significance of "a day's work for a day's pay."

13. ADAPTABILITY: The ability to cope with and adapt to the changing requirements of the occupational environment. Possesses the self-confidence to regard change as a natural ingredient of progress which is not to be feared, but rather viewed as an opportunity for improvement Demonstrates adaptability to adjust to changes in job assignments, systems, procedures, schedules, policies, and supervisors. Knows how to transfer and synthesize existing knowledge to new or more difficult situations, or to greater responsibilities. Is prepared to learn alternate skills in anticipation of lateral mobility to adapt to structural changes in the workforce toward service occupations which demand greater analytical and problem solving skills. Is prepared to learn more difficult skills in preparation for upward mobility beyond jobs typically available to teenagers and entry-level workers especially during periods of high unemployment. Can grasp the concept of changing job specifications and can forecast new competencies and performance standards that are likely and understand how to modify or upgrade existing skills to meet the new requirements Possesses the self-discipline to engage in self-study or self-improvement away from the formality of the classroom. Can set study goals and establish surroundings conducive to study. Knows how to locate and use resources outside the classroom Can follow study instructions and prepare for examinations independently. Maintains the capabilities and credentials to reenroll in education and training programs to upgrade job skills to stay current with requirements.

VIRGINIA PENINSULA
VOCATIONAL TRAINING COUNCIL
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VIRGINIA PENINSULA VOCATIONAL TRAINING COUNCIL

OVERALL COUNCIL GOALS

• • • The overall goal of the Council shall be to strengthen the economic growth and competitiveness of the Virginia Peninsula by fostering meaningful collaboration between business/government/industry and education and by providing occupational information to education so that graduates may be prepared appropriately for the opportunities available.

COUNCIL FUNCTIONS

- Provide a focal point for business/government/industry and education consensus in the interest of economic growth on the Virginia Peninsula.

- Facilitate collaborative ventures between business/government/industry and education.

- Provide an occupational demand delivery system to forecast quantitative and qualitative occupational information from business/government/industry to education concerning the scope and magnitude of occupational opportunities available.

- Implement regional measures to reinforce education efforts to develop community understanding and support of vocational education.

- Respond to requests from education for regional services in support of occupational education which cannot be provided effectively or efficiently at local levels.

- Participate in development and promotion of actions and recommendations to enhance regional, state, or national occupational education.

VIRGINIA PENINSULA VOCATIONAL TRAINING COUNCIL

COUNCIL ORGANIZATION (33)

Private Sector Employers (16)

- A mix of sixteen (16) executives, production supervisors, training officers, or personnelists representing product industries; service industries; sales; inventory menagement; financial services; informational services; leisure and tourism (usually a representative of the Virginia Peninsula Chamber of Commerce); hospitality and food services; automotive technology; electronics; manufacturing; machine technology; construction and utilities; health care and technology; private sector apprenticeship schools*; and proprietary schools*

Public Sector Employers (2)

- Representative, Military Installation Civil Service
- Representative, NASA Apprenticeship School^

Education (12)

- President, Thomas Nelson Community College*
- Superintendent, Hampton School Division*
- Superintendent, Newport News School Division*
- Superintendent, Poquoson School Division*
- Superintendent, Williamsburg/James City County School Division*
- Superintendent, York County School Division*
- Superintendent, Virginia School for the Deaf and Blind*
- Director, Vocational-Technical Education Center*
- Representative, Sarah Bonwell Hudgins Regional Center*
- Spokesperson, Vocational Directors/Administrators*
- Executive Director, Greater Peninsula Job Training Consortium*
- Representative-at-large, Education*

Governmental Agencies (3)

- Representative, Virginia Employment Commission
- Representative, Division of Apprenticeship Training
- Representative, Virginia Peninsula Economic Development Council

*"Categorized under Education and Training"

VIRGINIA PENINSULA VOCATIONAL TRAINING COUNCIL

FORECAST OF OCCUPATIONAL DEMAND

The Virginia Peninsula Vocational Training Council (VPVTC) believes that there are two structural imperatives for effective business/industry-education collaboration. First, there must be a forum, on neutral turf, where communication can take place; the Council itself serves this purpose. Second, there must be media, on neutral turf, in which relevant communication can take place. The Council minutes, in a rather comprehensive format, constitutes one form of such communication. Another medium deals with transmittal of occupational information. The Virginia Peninsula Vocational Training Council is perfecting a compendium of occupational information for each of about thirty occupations or occupational clusters which are mirrored by course offerings. This compendium is called a Forecast of Occupational Demand, and is simply a communications medium to transfer occupational information from employers to educators. The objective is to transfer real-world occupational information from employers, in a non-threatening way, to educators so that educators can develop curriculum and provide career guidance to better prepare their students for the employment opportunities realistically available. The forecast is thereby the "same sheet of music for everybody to read from." With two minor exceptions,* the Forecast does not contain information that is not available in fragmented form elsewhere; the key is that the Forecast contains integrated, coherent information. A Forecast of Occupational Demand contains the following sections:

1. Nature of the Occupation (Summary)
2. Quantitative Demand and Supply Data for the Virginia Peninsula Metropolitan Statistical Area
3. Core Competencies (or "Basics") as they relate to the specific occupation*
4. Entry-Level Competencies expected of high school graduates when they enter employment*
5. Advanced Competencies expected of community college graduates or workers who have been on the job for a while
6. Equipment, Tools, and Work Aids
7. Working Conditions
8. Occupational Behaviors and Attitudes
9. Mental and Physical Requirements
10. Occupational Career Potential
11. Compensation
12. Education and Training

* Not available elsewhere

Drive for Show -- Putt For Dough
Teaching Employability Skills in Vocational Education
By Richard D. Jones, Ph.D.

It is a real pleasure to be here and share some thoughts with you. I've titled my remarks "Drive for Show -- Putt for Dough." This time of year my thoughts turn to playing golf. "Drive for show and putt for dough," is an expression in golf of saying that while being able to drive the ball a long way is very impressive, it isn't the skill that separates the winners from the losers, particularly in the area of money. It is being able to putt and doing the very simple, little things within the game of golf that really make the difference in success.

My comments today will focus on the importance of employability skills. Many times we overlook the importance of those little things like teaching employability skills as part of our instructional programs. It may be those skills that determine whether that individual is successful in employment.

I want to talk this afternoon about the importance of employability skills and of the perspective in New York of how we've gone about identifying employability skills and weaving them into our programs. I will spend more time talking about what we can do in staff development which is the issue we are here to address.

Once we reach consensus on the purpose of and skills in vocational education we need to talk about the mechanisms that can be used to get tens of thousands of teachers to share that same perspective. The key responsibility in leading vocational education is in the area of staff development.

We do have a responsibility in vocational education for teaching employability or core skills. If we occupy a student's time for a half a day and we only emphasize making that student a good welder and they're still reading at a second grade level, we have wasted that student's time. When a teacher is hired by a school system to occupy a portion of the student s day, the teacher has a responsibiltity to teach more than specific technical skills. All teachers need to recognize the importance of basic skills and employability skills.

We in vocational education, as other people in other sections of our economy and society, need to be asking questions about what business we're really in. In the fable of the animal school that Dewey Adams shared, the animals really didn't recognize what business they were in; they thought they were in the business of teaching the very specific subjects of flying, climbing, running and swimming. They were really in the business of teaching how to get from one place to another. If they had recognized what they were really teaching they would have come out with a curriculum that was much different. And the result would have helped each individual excel and not stifle their skills. In vocational education we need to be continuing to ask those questions as to what business we're really in and that's a question that needs to be asked in each individual state and each individual agency. The answers may be different than the new federal legislation or what is happening in New York.

Each state and local agency must go through this questioning process.

Employability Skills

I would define employability skills as the area of skills that relate to seeking, obtaining, succeeding and advancing in work. This definition includes a laundry list of specific skills, many of which cross over into the basic skills area. Some skills are also in the technical area. It is very difficult to draw a distinction between employability, basic and technical skills. We need to carefully look and identify those skills and make sure that we are providing the right kinds of instruction to develop those skills.

We can all think of hundreds of examples where exemplary programs have taught employability skills. The problem is we haven't done that frequently enough and we haven't done it in every one of our vocational programs. More importantly, we haven't given the message to every one of our teachers that employability skills is one of our important purposes. That's a change that we need to do.

Teachers can still use many of the traditional instructional techniques of classroom and laboratory instruction, work experience programs, and youth leadership to develop those skills but the focus needs to change to make sure we're telling everyone within the system and outside of the system that employability skills are important.

Teacher in-service and staff development are two keys to being able to transfer this change in emphasis of employability skills to all of our instructional programs. As I observe the aging of vocational teachers, I recognize an increased need for staff development. Many of the vocational teachers were hired because of technical expertise. Some of them have taught a good, balanced program, but others have been relatively narrow and focused solely on technical skills. Now we are beginning to recognize that we need to go back to those teachers and ask them to do things differently than when they were hired. We need to make judgements about changes in programs. Where we have existing teachers in place, we need extensive inservice programs to help teachers make the transition.

In the past, one shot programs were used or we relied on teacher education traditional courses. The former did not create lasting results and the latter was not consistent with the kinds of new directions we wanted to implement.

We really haven't emphasized to all teachers in place the need for some degree of change. In thinking about that situation a story comes to mind of a woodcutter that moved to the Adirondack area in New York State to cut pulp wood. He was very industrious and instantly produced four times the output of his co-workers. However, his productivity quickly declined and the boss encouraged him to work harder. This went on for several days and the frustrated logger worked hard but produced very little. He was fired for low productivity. Only after he was fired did the boss discover that no one had shown him how to sharpen his saw. The point is that many times we spend a lot of time and word very hard, but unless we take time to sharpen our saw and improve our skills, our efforts may be wasted.

New Directions in New York

Let me share with you a little of what we've done in New York in identifying the skills that are important. We used a process that we call "Futuring." We brought business and industry people in and formed committees with various groups of educators. We followed a very tight agenda. We brought in a lot of experts to give their opinions on new directions for society, technology, education and vocational education. One of the principal directions we gave to those committees was that we want you to work together as a team but we want you to rely on the business and industry people to tell us what skills are important and then we want to rely on the educators to take a lead role in developing how best to teach those skills. We set new directions. Completing our project two years ago, we are now implementing those proposals. This is a very ambitious task because it means very significant changes for many of the teachers. We have a timeline that stretches out over the next three to four years before all of those pieces are implemented.

We have set a consistent goal of what directions we need to go and have set about implementing those.

One of the key recommendations that came out of that project was the identification of a set of core skills. In my handout is an outline of those core skills. Within the core skills are employability skills, basic skills, and some technical skills that are important for every individual. We spent a great deal of time developing detail core materials. We involved different teachers and industry people to give us the best perspective in identifying those core skills. Then we set about implementing the core within our curriculum. Some of the core took the form of some stand alone courses. We have courses that are required for all students in New York State. We have other courses that are required for all vocational students. We have a piece working with our elementary school colleagues to include keyboarding. There are other specialized core skills that will be a part of the specialized programs. The core takes many different forms but it is a consistent structure that all teachers should be emphasizing within occupational education. Another major recommendation was that we need to have better coordination within our curriculum. We've done a lot to give people the opportunity to exchange ideas. This has been very positive and people found out some very interesting information working with one another. We've also been trying to better coordinate with general education.

I am not going to go into any more detail about our New York program. The important things to remember from our efforts is that we spent time following a process to clarify our goals. We then got the commitment of all education leaders to say lets all work together to try and implement these recommendations. This leads me into making a few comments about where we go in teacher education and staff development.

Recommendations on Staff Development

Research says you're only going to remember four things from what I tell you today. Here are the four things! There are four steps that I see in staff development. The first is

that you've got to have activities to **expand teacher awareness.** The second step is that you've got to then **focus on the important skills.** In those two areas there is a time to create some divergent thinking and there is also a time to create some convergent thinking. The third step is that we need to **build ownership** in those new directions and the fourth step is that you've got to **reward and reinforce** those that do change. I think that many times our staff development only does one of those four and we don't pull together all of those steps. We may also do a step at the inappropriate time. Let me review each of these steps with some additional ideas. I hope these four steps will help you to organize the kinds of activities that you may be doing in staff development.

Expand Teacher Awareness

The first step is expanding teacher awareness. There is a time to make people uncomfortable. People don't change when they are comfortable. If things are going along fine from their perspective they aren't going to change. If you want that individual to change then that person has to be uncomfortable. If a change has been identified as important, then somehow you are going to have to make that person uncomfortable before introducing the change.

We need to bring in business and industry in many different forms and many different mechanisms. This should not simply be in the rubber stamp mode that some of our advisory councils operate. They need to be involved in many different aspects of what we do from curriculum development to advising on major directions. We need to put our teachers in the position to be able to see things. Look at the way we structure our education programs. All the time we have teachers through the school year, they're locked up in a classroom with students sharing their expertise. We give teachers very few opportunities to see new skills, participate in internships, or work in business and industry. We need to seek out as many ways as we can to put them in a position to see different things. More teachers need to be able to hear the kinds of discussions that have gone on here today.

Our efforts in competency based education need to be broader in perspective and include employability skills. I think we've erred on the side of including only technical skills in competency based education. We need to include other employability skills in the competency based design, even if it includes a lesser degree of objectivity. They still are important skills that need to be emphasized.

Focus on Important Skills

The second step is focusing on important skills. There comes a time when with all of that divergent thinking around, you need to reach consensus. You need to bring those ideas together. Once consensus is agreed, you need to communicate those ideas frequently and repetitiously in many different forms. We need to use new and old techniques to create a common understanding. Teachers will not support what they do not understand.

Build Ownership

A third step is building ownership. You need to get the commitment of people through team building. Involve teachers in a process early on so that they are supportive of it. One of the ways that we did this in New York was getting people to look to the future. We didn't tell people what you've been doing so far was terrible. We said, "We think things are going to change in the future. Let's sit down and think where we ought to be going in the future." We came out with some different directions without being critical of anything or anyone at the present time.

You need to involve teacher unions, administrators and teacher educators in your planning. One thing from my agriculture background that illustrates the value of working together is hybridization. A synergy comes about of bringing together people from different disciplines.

Reward and Reinforce

The last step is rewarding and reinforcing. Many times we put together a good staff development program but if there isn't a mechanism that reinforces change, everything we've done has been wasted effort. We need to look at the role of the adminsitrator in reinforcing many of those skills and in many cases we need to look at a very dramatic change in the structure of the way that we provide instruction. The way that we certify teachers may not reinforce the kinds of changes that we think are important. Changes in structure come with great difficulty. They only come with compromise. We can't overlook the importance of some of those structural changes if we really want to create lasting effects.

We need to make heros. We need to reward people and say, "Look, you've really done a super job." When we're pleased with the kinds of changes that have taken place, we need to reward and reinforce initial change so that permanent change really does come about.

Let me summarize by emphasizing that the employability skills I would characterize as the little things. They are the putting if you want to draw an analogy with golf. We need to emphasize those little things of employability skills. We need to carry through in our staff development programs the message that those skills are important and make sure that employability skills are a part of everything we do. Staff development, following the four step approach that I outlined, can make a difference.

A Strategy for Vocational Teacher Technological Update

by James B. Hamilton

In this brief presentation about a strategy for updating vocational teachers technologically, I would first like to discuss the need for such a strategy and then describe characteristics essential to such a strategy. In building the case for a strategy, I will first address the need for vocational teacher technological update and then answer the questions: What is being done about vocational teacher technological update? What is preventing teacher technological update from occurring to the extent needed? Finally, I will discuss a strategy for making this happen.

The Need for Vocational Teacher Technological Update

After several years of directing attention toward the pedagogical needs of vocational teachers, the National Center for Research in Vocational Education in 1982 began to study the need for updating vocational teachers in the technology of their occupational area of instruction. Although little recent research on the national level addresses the problem, in 1978 George Storm of Ferris State College addressed the importance of technological updating at the postsecondary level:

> In-service programs have almost become a requirement in the professions during the last decade. . . . Technological changes in business and industry leave no alternate choices to post-secondary occupational educators. If they want to remain competent instructors, they must maintain expertise in the latest technical developments in their respective occupations (p.11).

In spite of recognizing the need for continual updating of instructors' skills and knowledge, often updating did not occur. Reduced turnover among teachers, accompanied by longer tenure in their positions, further increased the disparity between teachers' technical competence and the current technology in their fields of instruction. Doty and Cappelle (1981), referring to Storm's work on technical upgrading, concluded that "inservice technical upgrading of postsecondary technical instructors . . . was found to be the most ignored area of staff development" (p.1).

Part of the problem seemed to stem from the fact that teaching institutions and state education agencies tended to place greater emphasis on pedagogical updating than on technical updating (Storm 1978, p. 12). Another problem was that as more institutions developed programs to meet high-technology demands, the supply of qualified teaching staff was being siphoned off into industry. For example, in computer graphics, a supply of qualified personnel barely existed for either vocational education or industry.

With support from the U.S. Department of Education, Office of Vocational and Adult Education, the National Center examined the extent and nature of the problem of keeping secondary and postsecondary vocational-technical teachers updated. Through literature searches and recent work done by the National Center, a number of individuals were

identified throughout the country who had recently addressed teacher technological update at either the secondary level or postsecondary level in their respective states. This group of experts was composed of state departments of education staff, teacher educators, educational consultants, and postsecondary representatives.

From this pool of experts, knowledgeable individuals from nine states were identified to prepare papers presenting their perceptions of the nature and extent of the need for technological update of secondary vocational teachers. They were also asked to describe approaches used for technological update of teachers in their states and the effectiveness of these approaches to identify possible barriers to the approaches. Similarly, experts from an additional nine states were identified to prepare papers presenting their perception of the nature and extent of the problem of technological update of postsecondary vocational-technical teachers and approaches utilized in their respective states.

The experts represented the following states:

SECONDARY LEVEL	POSTSECONDARY LEVEL
Alabama	Arizona
Connecticut	Florida
Kentucky	Indiana
Michigan	Maryland
Missouri	Minnesota
Oklahoma	Nebraska
Pennsylvania	South Carolina
Texas	Tennessee
Utah	Washington

The experts made estimates of the number of vocational teachers in their states who had "no need" for updating, "limited need," substantial need," and "critical need." Tables 1 and 2 present figures on instructors and teachers needing updating.

Table 1

Need for Technological Update of Postsecondary Instructors
by Occupational Areas in Eight Selected States

Occupational Area	Number of Instructors	Numbers and Percentages of Instructors in Need of Updating in the Technology of Their Teaching Field							
		No Need		Limited Need		Substantial Need		Critical Need	
		No.	%	No.	%	No.	%	No.	%
Agriculture	302	21	7	137	45	86	28	58	19
Marketing and Distribution	493	124	25	239	48	97	20	37	7
Home Economics-Occupational	389	36	9	188	48	105	27	60	15
Health Occupations	1359	319	23	620	46	277	20	143	11
Office Occupations	2558	326	13	846	33	640	25	746	29
Technical and Trade and Industry	4511	763	17	1535	34	1056	23	1157	26
TOTALS	9612	1589	17	3565	37	2261	24	2201	23

NOTE: "Need" is that identified or estimated by knowlegeable consultants from each state. Only eight of the nine states are represented because one of the consultants was reluctant to make estimates without further primary-source information.

SOURCE: James B. Hamilton, Michael E. Wonacott and Andonia Simandjuntak. Technological Update of Vocational/Technical Teachers: A Status Report. (Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1982). p. 14

Table 2

Need for Technological Update of Secondary Teachers
by Occupational Areas in Seven Selected States

Occupational Area	Number of Teachers	Numbers and Percentages of Teachers in Need of Updating in the Technology of Their Teaching Field							
		No Need		Limited Need		Substantial Need		Critical Need	
		No.	%	No.	%	No.	%	No.	%
Agriculture	5,952	1205	20	2961	50	1455	24	331	6
Marketing and Distribution	2,501	218	9	1741	70	472	19	70	3
Home Economics - Occupational	5,326	2736	51	1565	21	796	15	229	4
Health Occupations	1,122	98	9	575	51	380	34	69	6
Office Occupations	6,206	2681	43	1856	30	1366	22	303	5
Technical and Trade and Industry	6,380	1078	17	2595	41	1827	29	880	14
TOTALS	27,487	8016	29	11293	41	6296	23	1882	7

NOTE: "Need" is that identified or estimated by knowledgeable consultants from each state. Only seven of the nine states are represented because two of the consultants were reluctant to make estimates without further primary-source information.

SOURCE: James B. Hamilton, Michael E. Wonacott and Andonia Simandjuntak. Technological Update of Vocational/Technical Teachers: A Status Report. (Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1982). p. 14

Need at the Postsecondary Level

Nearly half (47 percent) of the postsecondary instructors in eight states had critical or substantial need for updating. In real numbers, this was an estimated 4,462 postsecondary instructors. The postsecondary-level findings were based on a total of 9,612 postsecondary instructors. Only eight of the nine states listed were represented in this count since one of the consultants could not make estimates without further primary source data.

When the need for postsecondary teacher technological update was broken down from area of greatest need to area of least need, the rank order was this:

Office Occupations -- 1,381 instructors (54 percent of 2,558 instructors)
Technical and Trade and Industry -- 2,210 instructors (49 percent of 4,511)
Agriculture -- 144 instructors (47 percent of 302 instructors)
Home Economics Occupations -- 163 instructors (42 percent of 389 instructors)
Health Occupations -- 421 instructors (31 percent of 1,359 instructors)
Marketing and Distribution -- 133 instructors (27 percent of 493 instructors)

Need at the Secondary Level

Thirty percent of secondary vocational teachers in seven states were considered to have critical or substantial need for updating. This was an estimated 8,178 secondary teachers.

The total number of teachers included at the secondary level was 27,487, representing seven states. As with the postsecondary level data, this information was also broken down into six occupational service areas.

When the need for secondary teacher technological update was broken down from area of greatest need to area of least need the rank order was as follows:

Technical and Trade and Industry -- 2,707 teachers (43 percent of 6,380 teachers)
Health Occupations -- 449 teachers (40 percent of 1,122 teachers)
Agriculture -- 1,786 teachers (30 percent of 5,952 teachers)
Office Occupations -- 1,669 teachers (27 percent of 6,206 teachers)
Marketing and Distribution -- 542 teachers (22 percent of 2,501 teachers)
Home Economics Occupations -- 1,025 teachers (19 percent of 5,326 teachers)

Approaches to Teacher Technological Update

In the 18 states studied, 17 of the experts cited participation in workshops, conferences and seminars as the most universal approach to teacher update. Other methods cited for half the states included: university-college course work, summer employment, and university-college technical updating programs. Approximately one-third of the states, for both secondary and postsecondary teachers, reported the use of business-industry exchange programs and visits to business-industry sites as being used in teacher update.

When asked to identify the approaches with the greatest potential for success in updating teachers, there was almost universal agreement regarding the top two approaches. These were (1) workshops, conferences and seminars, and (2) collaborative activities -- programs between schools and business-industry for teachers' occupational experiences and curriculum content update.

Other approaches that were identified by at least half the consultants as having high potential for success were (1) inservice courses conducted by a university or college in cooperation with a state or local agency and business and industry and (2) summer employment of the teachers.

Barriers to Teacher Technological Update

Each of these potential approaches to vocational teacher technological update was found to be implemented successfully in a number of settings. Each approach was described in some detail along with specific examples of programs in operation (Wonacott and Hamilton 1983). These approaches were not being offered universally nor were all teachers in need of update participation in the programs and activities that were available.

In seeking to explain the discrepancies between apparent need, programs offered, and teacher participation, several barriers were identified. In the opinion of both the postsecondary and secondary level experts the following barriers exist (Hamilton et al 1982):

> The lack of resources such as time, money, and links with external organizations were barriers to succesful technologic al updating of vocational-technical teachers.
>
> Nearly half the experts identified these two barriers: teacher/administrator lack of awareness of need and teacher/administrator lack of motivation.
>
> The lack of equipment and expertise available to the teacher was cited as a barrier at both secondary and postsecondary levels.
>
> Other barriers at the secondary level were lack of awareness of the need by business-industry, lack of planning by administrators, and current updating topics not based on need assessments (p. 45).

These barriers appear to be common in spite of program delivery techniques used to update teachers. Someone has to pay for the program, the teachers must be willing to participate, administrative policy must at least allow for it, and the update activities must be within a reasonable distance. Shortcomings regarding teacher technological update appeared to be the result of inadequate attention directed toward recognition and removal of the barriers. Although we may be safe in assuming that delivery techniques are sound and appropriately used, we also should recognize that something may be lacking in the context

surrounding the use of those techniques. "What appeared to be lacking is an overall strategy for technological update in which individual delivery techniques can be implemented" (Hamilton and Wonacott 1984, p.4). They further concluded that "Given that the delivery techniques -- the tactics -- used in a given update event are sound, it must be that a revised strategy is needed to account for all the factors that affect the provision of up-to-date technological knowledge and skills to vocational teachers (p. 4).

A Strategy for Teacher Technological Update

It was recognized that a single formula could not be developed and applied universally to every technological update program. Rather, a set of generic characteristics could better serve states and local districts in formulating a specific strategy that would support the different details and situational factors of the setting.

Again, a panel of experts was identified and assembled to formulate the essential characteristics of a strategy for technological update. Collectively, the panel represented a wide variety of experiences and perspectives in the area of technological update. Panel members were drawn from business, industry, two-year postsecondary institutions, teacher education, and state departments of education.

Through a process of inductive analysis of previous work done by the National Center, the panel's experience and expertise, and the literature, the following set of nine essential characteristics of a strategy for technological update emerged (Hamilton and Wonacott 1984, p. 6):

> The strategy should provide an **organization or structure for action** -- i.e., a logical sequence of steps to follow in designing and carrying out technological update programs or activities.
>
> The strategy should define the **roles and responsibilities** of all the individuals involved -- teachers, administrators, department of education personnel, teacher educators, and business, industry, and labor participants.
>
> The strategy should present **policy statements** to support the roles and responsibilities of those involved and the activities in which they participate.
>
> The strategy should define and provide the **resources** necessary and available to teachers for participating in activities to gain technological update.
>
> The strategy should provide **incentives and rewards** to achieve and maintain motivation to participate in technological update activities

and incorporate the results into program curricula.

The strategy should identify and provide a variety of techniques by which teachers can gain technological updating.

The strategy should allow for and provide alternative and creative configurations of techniques that best meet the individual needs of teachers seeking updating.

The strategy should provide for the incorporation of the knowledge and skills gained in update activities into the instructional program or course materials.

The strategy should provide for continuing and self-renewing activities to maintain technological update on the part of all involved.

Within the limits of this brief presentation it is not practical to elaborate upon each of these characteristics. It should be pointed out, however, that a more detailed description and an in-depth discussion of each characteristic are provided in the publication cited, Updating Teachers for Tomorrow's Technology: A Strategy for Action. Nine chapters -- one for each essential characteristic -- address the concepts and their implementation.

As we study the needs for teacher technological update and observe present update programs and practices, we are led to conclude that implementation of an effective strategy is needed at state and local district levels. The essential characteristics of such a strategy have been formulated. These characteristics, derived from successful experiences and the keen insight of a broad base of knowledgeable experts, are, however, in need of testing through implementation at state and local levels.

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Technological Update — Who's Responsible

by Gary Bunch

Technological update! Who is responsible? Is it a national problem with responsibility falling to the U.S. Department of Education? Or, maybe it's a state problem with State Department of Education responsibility. Could it be the local vocational school administrator's problem, or does the responsibility lie with the teachers? What about business and industry? Do they have a responsibility?

Asking who's responsible sounds like a simple enough question, but we know that it is not. Nor does it have a simple answer. Although answers exist, they help identify obstacles that must be overcome. The National Center for Research in Vocational Education of the Ohio State University conducted a study of 18 states to identify some of the obstacles and barriers. Some interesting observations can be made from their findings.

Lack of money was the **number one obstacle** identified. From my experience gained while serving on the staff industry exchange advisory committee in Kentucky, I found a lack of funds kept us from: (1) hiring substitute teachers while the designated teacher was attending a business and industry conference, (2) paying travel and educational expenses, and (3) paying the instructor while away from the classroom.

The **second obstacle** was time. Time off to attend seminars and other update activities is vital. Unlike liberal arts teachers who can gain their continued education at universities on schedules arranged for their convenience, vocational educators must attend seminars that are scheduled to meet the needs of industry. Vocational educators must have time available during the school year if they are to stay technologically competent.

Many vocational programs operate year round. This presents additional time conflicts. Not only does it pose a problem for technological update, but what about continuing certification course requirements? Vocational educators must have a firm commitment for time off to participate in update activities.

Lack of linkage with external organizations was the **third greatest obstacle.** It is difficult and sometimes impractical for every school to have "good" connections. Program craft advisory committees serve this function very well. I will discuss their role later. The State Department of Education is a logical contact point to establish the links on a large scale.

Lack of awareness of need by administrators was the **fourth obstacle.** I find this one to be very troubling and, frankly, inexcusable. Knowing the developmental needs of your people and helping them meet those needs is a major requirement of effective management, not an option. Maybe administrators need to attend some basic management programs. Maybe administrators performance evaluations should be based less on bureaucratic paper handling and more on effective management.

Lack of motivation by teachers and administrators tied lack of awareness of need by

administrators for fourth. Why? Basic management principles teach us that most people respond favorably (become motivated) when they perceive a positive stimuli. Teachers ask, "What's in it for me?" The school says it's important, but what does the school do? They won't pay for expenses, they won't provide the time off, and there is no advancement opportunity or salary increase for technological update. A basic communication principle states that the non-verbal message out-weighs the verbal. Administrators say Federal and State agencies provide little money for support and they do not evaluate their performance by technological update of the instructors. So, what's in it for them?

Those are the top four. What was the last one identified by the study? Lack of awareness by business and industry.

Everyone assumes business and industry aren't interested. Not true! Business and industry just don't realize they're needed and don't know how to help, even if they do recognize the need. It is education's responsibility to make business and industry aware of their needs. Craft advisory committees are one very effective way for education to make business and industry aware of their needs.

Those are the obstacles. Now, what can be done about them?

Let me restate: there are no simple answers. Let me, however, share these observations. They come from my experience as a vocational educator, a counselor who has dealt with many frustrated educators and administrators and as a person who worked with state officials to improve the system. But, most of all, these observations come from someone who cares very much about what happens to vocational education.

First, the money issue. Federal and State officials put your money where your mouth is. Technological update is not free. If you're not willing to support it financially, then quit talking about it. If it's important, then show educators that it is important. Show them continued techological update is important enough to affect their pocket book just as much as additional university education. Vocational teachers have very different responsibilities and needs from liberal arts teachers. We all need to accept that as well. Break that old mold and begin evaluating and paying them by the standards you <u>say</u> are important.

If my boss continually tells me how important it is for me to stay technologically current yet never approves my request to participate in update activities and then evaluates me (pays me) on other criteria, what am I to believe? There's a strong mixed message there that has an obvious conclusion.

What about time? State boards must take the lead by developing policies that are conducive to technological update. Make local administrators responsibile and accountable for technologically up-to-date teachers. If possible, help provide funding for substitute teachers -- be creative, make it happen! Local administrators must see technological update as a high priority. Links with external organizations are not always easy to make. Who do you contact? Who makes the contact? Craft advisory committees are excellent starting points. More importantly, <u>effective</u> advisory committees are needed. While this is normally controlled by the teacher, the local administrator must be involved. Effective

committees cannot be "rubber-stamp" organizations. Vocational educators don't know how to develop and operate advisory committees. As an educator, I was once told to have an advisory committee, but no one gave me instructions or guidance on how to select or operate one. There is a real need to teach vocational educators what advisory committees are for, how to use them, and how to select members.

Business and industry are much more willing to serve education than education thinks they are. The National Center's research identified lack of awareness by business and industry as the least of the obstacles. If that is the case, why aren't business and industry more involved? One reason is they aren't invited. When they are invited, their time is often wasted. Often they are not asked for input, but are requested to listen and approve plans that have already been finalized. If you want real involvement from business and industries, then involve them. Don't ask them to be rubber stamps.

Solutions

1. Teach educators how to use advisory committees.
2. Provide administrative support.
3. Expect business and industry personnel to provide assistance. (Don't be afraid to make special requests).
4. Effective advisory committees can do more to identify teachers' needs and find a means of meeting those needs than education will be able to find on its own. After all, business and industry deal with this subject all day long. The local school administrator cannot.

Lack of awareness of need by administrators is a problem that can be corrected. Help administrators feel accountable for the calibre of the education that occurs. Give them the power to function and then expect them to use it. Untie their hands.

If lack of motivation by teachers and administrators is a problem try to correct it by holding them accountable. Provide dollar incentives consistent with other educational activities. If you are going to provide a step on the pay scale for continued academic education, why not provide similar pay incentives for technological update activities.

Who is responsible for technological update? Obviously, everyone is.

SUMMARY

Given by Rupert Evans

It is virtually impossible to summarize a set of papers and a discussion which have ranged as far and wide as ours has today. For some reason, people seem to like me to try to do the impossible, and I am foolish enough to accept. I try to get around the impossibilities, however, by stating the obvious, rather than by trying to recapitulate all that has been said.

The Basics. All who are concerned with staff development in vocational education, whether they are on the receiving or the delivery end of the system, must pay attention to society's demand for more attention to the basics. Society's demands have come ten years too late, and well after the profession had already begun to make long-needed changes. Some of the demands are ill-founded and ill-presented. Nevertheless, they must be heard and a visible response must come forward.

It helps in preparing our response to have some idea of why society wants more attention to occupational and academic basics. The demand has roots in demography and economics.

Most of the demographic problems have grown from a rapidly decreased number of births which have resulted two decades later in a shortage of young workers in the suburbs. Whether this shortage will come to the inner cities and rural areas depends much on immigration and farm policy. A suburban shortage, however, is enough to rouse the movers and shakers of public opinion. Their response is designed to make sure that the smaller number of new workers is more adequately prepared to do the white collar jobs than was the previous generation. If one needs to employ young workers and there is a smaller and smaller pool of them from which to choose, it is important, economically, to make sure that the pool is well prepared and well socialized.

You may disagree with my brief demographic and economic analysis, but I am sure that you will agree with our presenters that in-service education is important for helping teachers cope with society's demands for more and better instruction in the basics.

Technical Updating. A second theme which ran through much of our discussion today was related to the best ways of providing technical updating to vocational teachers. There was no disagreement about the absolute necessity of providing such updating far more frequently and extensively than in the past.

We spent much more time addressing the questions of how to identify who needed updating and who should provide it than we spent on how to make sure that vocational teachers receive the programs they need and want. "Carrots and sticks" are both needed. Carrots are rewards allotted to those who provide in-service education and to those who participate in it and learn from it. Sticks are punishments allotted to those who fail to provide needed in-service education and to those who fail to work at it and learn from it.

IEP for Teachers. After much wasted time and motion, we are beginning to provide a sound Individualized Educational Plan (IEP) for most learners who have handicaps. Obviously, the IEP concept is useful for *all* learners of all ages. We should demand that every assessment of teacher competency and every major curriculum revision be reflected in the IEP's of the teachers involved. Most, if not all in-service education programs should be built around the needs identified through an analysis of the IEP's of teachers in the school or region.

Sometimes in our discussions it sounded as if teacher educators were not on the agenda. We need to have our competency tested and to have an IEP which leads to better preformance, just as much as any classroom teacher in a small secondary school.

Program Improvement. It seems clear that very little of the Perkins Act emphasis on program improvement is going to be directed toward providing IEP's and programs and carrots and sticks which will improve vocational teachers. This is a curious anomaly, since there is general agreement that nothing can do more to improve a program than the presence of a first rate teacher. This conference would have far-reaching effects if it could convince policy makers that in-service education of vocational teachers ought to receive higher priority among program improvement efforts.

Please join me in thanking each of the program planners, presenters and discussants who made this conference such a success.

Appendixes

APPENDIX A

Agenda for
An Invitational Colloquium on In-Service Teacher Education: A Key To Excellence in Vocational Education

Sponsored by the
Coordinating Commitee on Research in Vocational Education

in cooperation with the
American Vocational Education Personnel Development Association
and the
National Research Coordinating Unit Association

Hosted by the
United States Department of Education

April 10, 1985
8:45 a.m. -- 3:45 p.m.

Room 3000
Federal Office Building 6 (FOB 6)
400 Maryland Ave. S.W.
Washington, DC 20202

9:15 - 9:20	Welcoming Remarks	Dr. Howard Hjelm, Chairman Coordinating Committee on Research in Vocational Education U.S. Department of Education
9:20 - 9:30	Introduction and Colloquium Purpose	Dr. Rupert Evans, Professor Emeritus Vocational and Technical Education University of Illinois Champaign, Ill.
9:30 - 10:00	"Assessing the Professional Performance of Teachers: Principles and Practices"	Dr. Glen Fardig University of Central Florida Orlando, Fla.
10:00 - 10:30	"Competency Testing -- Legal Aspects"	Dr. August W. Steinhilber General Counsel National School Board Association Alexandria, Va.
10:30 - 10:45	Coffee Break	
10:45 - 11:15	"Basic Skills -- Integration of Mathematics and Science Into the Teaching of Vocational Education"	Dr. Donald Maley, Professor, Chairman Industrial, Technological and Occupational Education University of Maryland College Park, Md.

11:15 - 11:45	"Integration of Basic Skills Into the Teaching of Vocational Education"	Dr. Dewey Adams, Professor, Chairman Comprehensive Vocational Education The Ohio State University Columbus, Ohio
11:45 - 1:00	Lunch	
1:00 - 1:30	"Basics for Employment: Keeping the Job"	Mr. Lee Stewart Administrative Manager Wyle Laboratories Hampton, Va.
1:30 - 2:00	"Drive for Show - Putt for Dough: Teaching Employability Skills in Occupational Education"	Dr. Richard Jones, Manager Bureau of Occupational Education New York State Department of Education Albany, N.Y.
2:00 -2:15	Coffee Break	
2:15 - 2:45	"A Strategy for Vocational Teacher Technological Update"	Dr. James Hamilton Senior Research Specialist The National Center For Research in Vocational Education The Ohio State University Columbus, Ohio
2:45 - 3:15	"Technological Update. . . Who's Responsible?"	Mr. Gary Bunch Cleveland Electric Illumination Co. Cleveland, Ohio
3:15 - 3:30	Summarization and Concluding Remarks	Dr. Rupert Evans
3:30 - 3:45	Final Question and Answer Period	Dr. Howard Hjelm

APPENDIX B

Colloquium Guests

Bernice Anderson, U.S. Department of Education
Joyce Beach, Fitchburg State College, Fitchburg, Mass.
Jack Bell, National Tooling and Machining Association, Oxon Hill, Md.
Juanita Bice, Oklahoma State Department of Education, Stillwater, Okla.
James Bishop, Pennsylvania State Department of Education, Harrisburg, Penn.
Glenn C. Boerrigter, U.S. Department of Education
Dan Bristow, Texas Education Agency, Austin, Texas
Ronald Bucknam, National Institute of Education
Joyce Campbell, U.S. Department of Education
Larry Case, U.S. Department of Education
Joseph Cassello, U.S. Department of Education
Charlotte Conaway, U.S. Department of Education
Leroy Cornelsen, U.S. Department of Education
William Daniels, Northwest Curriculum Coordination Center, Olympia, Wash.
Earl Dodrill, U.S. Department of Education
Nevin Frantz, Virginia Polytechnic Institute and State University, Blacksburg, Va.
Doris Gunderson, U.S. Department of Education
Joseph Helbling, Illinois State Department of Education, Springfield, Ill.
Roy Hinrichs, Southeast Curriculum Coordination Center, Mississippi State, Mississippi
Howard F. Hjelm, U.S. Department of Education
Laura Karl, U.S. Department of Education
Barbara Kline, National Academy of Vocational Education, Columbus, Ohio
Juliette N. Lester, U.S. Department of Education
Helen Lipscomb, Florida State Department of Education, Tallahassee, Fla.
Robert Morgan, National Center for Education Statistics
Mark Newton, National Center for Research in Vocational Education, Columbus, Ohio
Robert Patton, Midwest Curriculum Coordination Center, Stillwater, Okla.
Ruth V. Patton, East Central Curriculum Coordination Center, Springfield, Ill.
Martha Pocsi, Northeast Curriculum Coordination Center, Old Bridge, N.J.
Walter Purdy, Edison Electric Institute, Washington, D.C.
Jed Richardson, U.S. Department of Education
C. Paul Scott, University of Georgia, Athens, Ga.
Ethel Smith, Vocational-Industrial Clubs of America, Leesburg, Va.
Charles Stamps, Nevada State Department of Education, Carson City, Nev.
Merle Strong, University of Wisconsin, Madison, Wis.
John Struck, National Association of State Directors of Vocational Education, Camp Hill, Penn.
Muriel Shay Tapman, U.S. Department of Education

Colloquium Guests, continued...

Rafael Valdivieso, Hispanic Policy Development Project, Washington, D.C.

Priscilla Walsh, New Jersey State Department of Education, Trenton, N.J.

Thomas W. White, U.S. Department of Education

Robert M. Worthington, Assistant Secretary of Vocational and Adult Education, U.S. Department of Education

Lawrence F.H. Zane, Western Curriculum Coordination Center, Honolulu, Hawaii

APPENDIX C

Presenter's Vitae

Howard F. Hjelm

Dr. Hjelm is the Director of the Division of Innovation and Development in the Office of Vocational and Adult Education, U.S. Department of Education. The Division is responsible for the national discretionary programs in vocational and adult education, rural education, bilingual vocational education, corrections education and adult education as well as the Department's concerns for Indian and Hawaiian native vocational education. Dr. Hjelm received the Bachelor's and Master's degrees in Mathematics from Augsberg College and Macalester College. He earned his Doctorate in Psychometrics from George Peabody College for Teachers at Vanderbilt University. He is also a graduate of the Federal Executive Institute.

Dr. Hjelm taught in the LeSueur, Minn., Public High School and was also an instructor at the Kindergarten Teacher's College in Tanzania. He was, for a time, an educational research specialist with the Organization of American States. Dr. Hjelm has held a number of administrative positions in educational research and development in the U.S. Department of Education, including Acting Associate Commissioner for Educational Research and Development, Acting Associate Commissioner for Adult, Vocational, Technical and Manpower Education, Acting Assistant Secretary for Vocational and Adult Education, and Acting Deputy Assistant Secretary for Vocational and Adult Education. He is the Chair of the Coordinating Committee on Research in Vocational Education.

Rupert N. Evans

Dr. Evans is Professor Emeritus of Vocational and Technical Education at the University of Illinois, Champaign, Illinois. For 35 years he has been on the faculty at that institution, at one time as Dean of the Department of Vocational and Technical Education. Currently Dr. Evans is involved with research and consultation on formulation of training policy, effectiveness of research in vocational education and the use of computers in technical education.

Dr. Evans received his B.S. degree in Social Studies and Industrial Arts from Indiana State Teachers College in 1946. In 1949 he was awarded the M.S. degree in Trade and Industrial Education from Purdue University where he earned his Ph.D. in Industrial Psychology in 1950. He has been the recipient of numerous honors including the Distinguished Service Award from the American Vocational Association. Dr. Evans has been awarded three honorary doctorates and in 1957-58 was a Fulbright Lecturer in Japan.

Dr. Evans has served as visiting professor, lecturer or consultant at 18 colleges and universities and in 18 foreign countries. He served as consultant to the Vice President's Task Force on Youth Unemployment, the National Association of State Directors of Vocational Education and the U.S. Navy and Air Force. He has authored eight books and numerous monographs and articles. He is presently President-elect of the American Vocational Education Personnel Development Association.

Glen E. Fardig

Dr. Fardig heads funded projects related to vocational education and teacher education including the development of individualized instructional materials for the Florida Beginning Teacher Program; the construction of vocational teacher assessment instruments for the Florida Performance Measurement System; and the identification of barriers to the implementation of competency-based vocational education. He has been responsible for the design and implementation of a model performance-based vocational teacher education program at the University of Central Florida, Orlando, and continues to develop modularized instructional materials for vocational teachers and administrators.

Dr. Fardig received his Doctorate in Teacher Education from Florida State University. In addition to his present work at the University of Central Florida, he has held positions in education at the University of Miami, the University of Kentucky, and the National Center for Research in Vocational Education, The Ohio State University. Dr. Fardig also conducts workshops and does consulting on competency-based education and staff development for a wide range of colleges, universities and postsecondary training institutions.

August W. Steinhilber

August W. Steinhilber was appointed an Associate Executive Director of the National School Boards Association in 1978. He has served as Assistant Executive Director and Director for Federal Relations since joining the NSBA staff in 1968. The office is responsible for representing the interests of school boards before the courts, and state legislation or regulatory agencies. Within his office are the Council of School Attorneys and the Conference of School Board Negotiators.

From 1960-68, Mr. Steinhilber was Deputy Assistant Commissioner for Legislation, U.S. Office of Education, Department of Health, Education and Welfare. He was previously an attorney, accountant and management consultant in private industry.

A native of Cleveland, Ohio, Mr. Steinhilber received a B.A. degree in Political Science from Case/Western University in 1954 and a J.D. degree from Georgetown University Law Center in 1960. He has an extensive record of professional and community activity. He is author or editor of numerous books and articles on law and education and is admitted to practice before the Ohio bar, District of Columbia bar and U.S. Supreme Court. He is current Chairman of the Educators' Ad Hoc Committee on Copyright Law; a member of the American Association of School Administration; the Bar Association of the District of Columbia; the Federal Bar Association; and is past president of the National Organization on Legal Problems in Education and the Committee for Full Funding of Educational Programs.

Donald Maley

Dr. Maley has been Professor and Chairman of the Department of Industrial, Technological and Occupational Education at the University of Maryland in College Park since 1957, and has been on the faculty there since 1946. In 1980 Dr. Maley was guest lecturer and consultant to the Ministry of Education in Athens, Greece.

A native of Pennsylvania, Dr. Maley received his B.S. degree in Industrial Arts from California (Pennsylvania) State Teachers College in 1944. He received a M.A. degree and Ph.D. in Industrial Education from the University of Maryland. He was listed in Who's Who in America (1978-79)and in Notable Americans (1976-77).

Dr. Maley has authored or co-authored three books and has edited or had chapters in eight others. He has produced more than fifty journal articles and several monographs in the industrial arts and teacher education areas. He is presently involved in a research project, "The Integration of Mathematics and Science into the Study of Industrial Arts/Technology Education."

Dewey Allen Adams

Dr. Adams is Professor and Chairperson for Comprehensive Vocational Education at The Ohio State University where he manages a doctoral program for the preparation and inservice education of administrators, teacher educators, researchers, instructors and trainers for colleges, businesses and industries, and secondary schools.

He has served as Director of Vocational and Technical Education at Virginia Polytechnic Institute and State University; Coordinator of the Community College Internship Program at North Carolina State University; Director of Adult and Continuing Education at Rockingham Community College and area consultant for vocational and technical education in the North Carolina State Department of Education; high school principal, vocational teacher and math and science teacher.

He is active in the American Vocational Association, American Technical Education Association, Phi Delta Kappa, Omicron Tau Theta, the American Society for Training and Development, Iota Lambda Sigma and the American Vocational Education Personnel Development Association. Dr. Adams has done extensive consultant work and publications.

Leroy (Lee) Stewart

Mr. Stewart graduated from Latrobe, Penn., High School and attended Long Beach City College, University of Southern California, Kent State University and George Washington University where he received his Bachelor and Master's degrees in Administration. He has 18 years experience in the civilian electronics industry and is Administrative Manager of Wyle Laboratories.

He served as member and Chairman of the Hampton, Va., Vocational Advisory Council for nine years and also was Co-chairman of the task force and Chairman of the Business, Government, and Industry Group on Vocational Education for Economic Growth for the State of Virginia.

Mr. Stewart is serving on the Virginia Peninsula Industrial Committee (PIC) and the Virginia Peninsula Vocational Training Council Executive Committee. He is Chairman of the Collaboration Council for the Innovative Master Technician Project for the State of Virginia.

Richard D. Jones

Dr. Jones is Manager of the New York State Education Department's Bureau of Occupational Education Program Development. Prior to 1981 he was Associate Manager of the Bureau of Agricultural Education in New York. He taught agriculture for seven years, served as State President of the New York Association of Future Farmers of America and National Vice President of FFA in 1967-68.

Dr. Jones attended Cornell University, Ithaca, N.Y., where he received his B.S. degree in Agricultural Education in 1971 and his Master's degree in Agricultural and Occupational Education in 1977. He earned his Doctorate from Cornell in 1978 in Agricultural and Occupational Education.

Presently Dr. Jones is supervising New York's futuring project which is reviewing occupational and practical arts education in response to shifts to a society based on technology and information. He is managing curriculum development and teacher inservice education for occupational education in the state.

James B. Hamilton

Dr. Hamilton is currently Senior Research Specialist at the National Center for Research in Vocational Education, The Ohio State University in Columbus. He received his B.S. degree in Agricultural Education and his Master's degree in Secondary Education from New Mexico State University. His Ph.D. in Agricultural Education is from The Ohio State University.

Dr. Hamilton developed the Performance-Based Teacher Education (PBTE) modules for Serving Special/Exceptional Students, Improving Basic Skills and for Conducting Competency-Based Education, and the development, testing, revision and refinement of a series of 100 research-based, individualized PBTE modules. He has supervisory responsibility for projects identifying and verifying professional competencies needed by teachers, administrators and planners. He has also been active in the development of approaches and strategies for technological update of teachers. Dr. Hamilton is Coordinator of the National Center's Advanced Studies Center, sponsored by the Office of Vocational and Adult Education, U.S. Department of Education.

Gary L. Bunch

Mr. Bunch received an Associate degree in Automotive Service and a Bachelor's degree in Trade-Technical Teaching from Ferris State College, Big Rapids, Mich. He developed and taught vocational auto mechanics programs at the high school and college levels in Michigan prior to joining Whayne Supply Co., Louisville, Ky., in 1973.

As training manager for Whayne, the largest multi-location U.S. Caterpillar Tractor distributor, he participated in vocational education. His involvement included Chairman of the Kentucky Staff/Industry Exchange Program; chairman of nine craft advisory committees; speaker at 1978 and 1979 AVA Conferences; Consultant to the National Center on Technological Update of Vocational Educators; and presenter of numerous seminars and workshops for vocational teachers and administrators. Mr. Bunch is employed at the Cleveland Electric Illuminating Co., Cleveland, Ohio, as Management Development Specialist.